FOOD MANUFACTURE

Incorporating Food Industries Weekly

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP JANUARY 1, 1958

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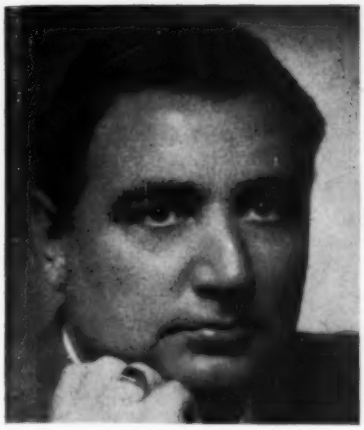

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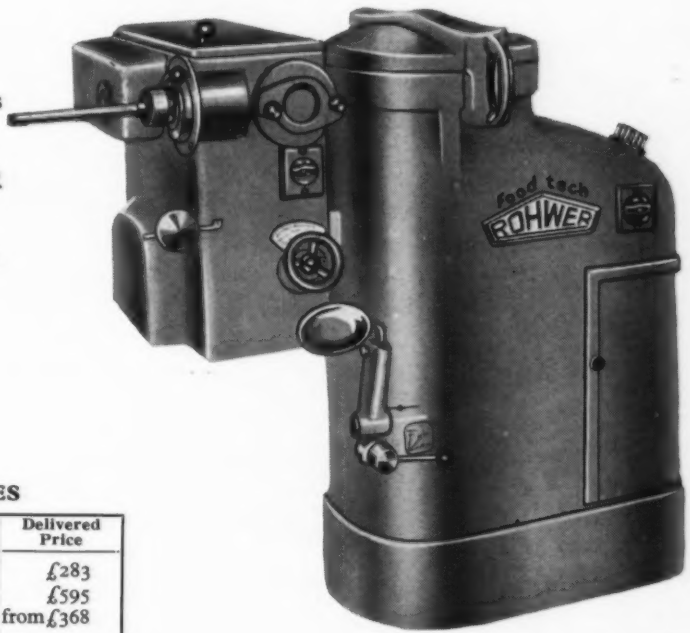

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Linking Attachment		from £368
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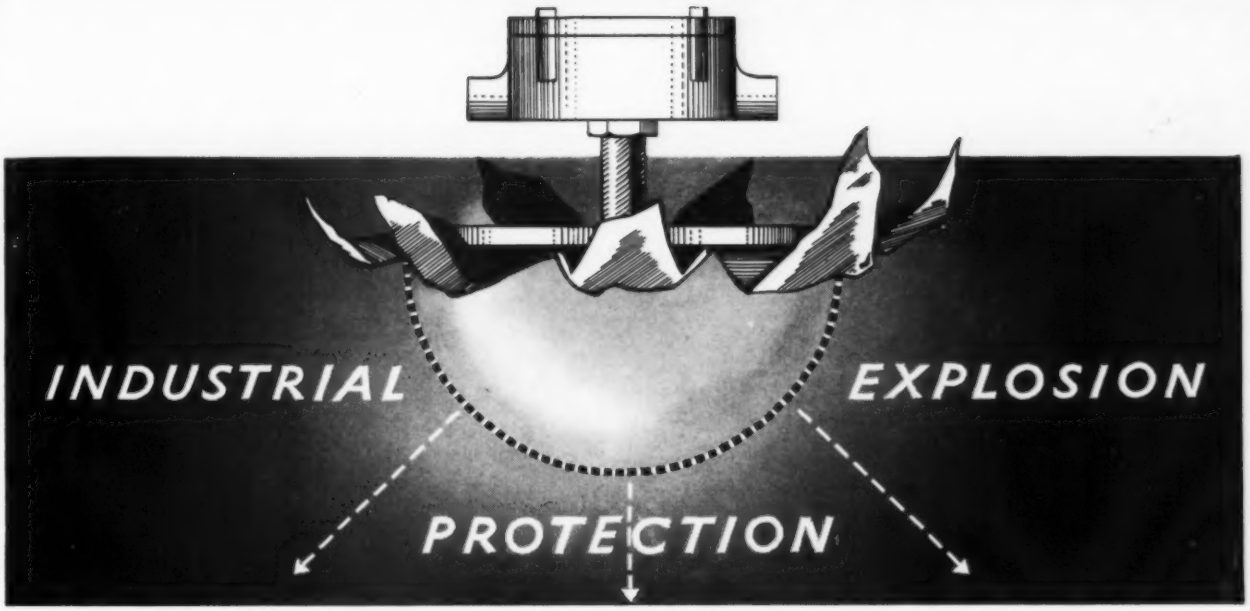
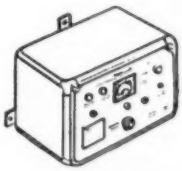


Any material that will burn in the bulk can explode as a dust/air mixture when sufficiently finely ground. Explosions are therefore liable to occur in any plant where such materials are processed or handled.

Illustrated below are just a few of our many types of equipment for combating explosions.

PNEUMATIC EXPLOSION DETECTOR for the detection of explosions very early in their pressure growth.

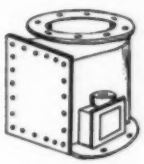


ELECTRICAL POWER UNIT provides the current for operating equipment when explosion detector contacts close.

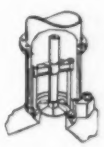
"ARMOURPLATE" GLASS BURSTING DISC for the relief of gaseous and dust/air mixture explosions.

HIGH RATE DISCHARGE BOTTLE used when hemispherical suppressors can not be accommodated internally.

HEMISPHERICAL SUPPRESSOR for the internal suppression of explosions.



HIGH SPEED ISOLATION VALVE for preventing flame in ducting. An eight inch valve fully closes in eighty milliseconds.



EXPLOSION RELIEF VALVE for the relief of gaseous and dust/air mixture explosions, where a pressure operated vent is permissible.

HIGH SPEED OPERATED BUTTERFLY VALVE for the sudden stoppage of airflow and for enabling suppressant to be retained in systems when an explosion occurs.

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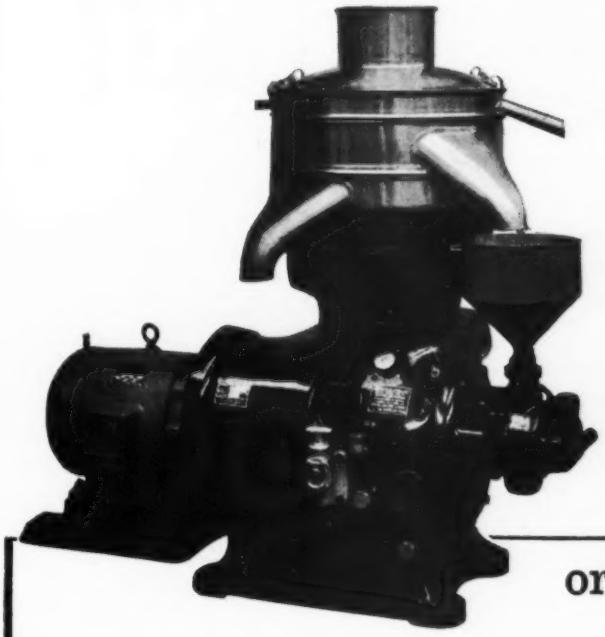

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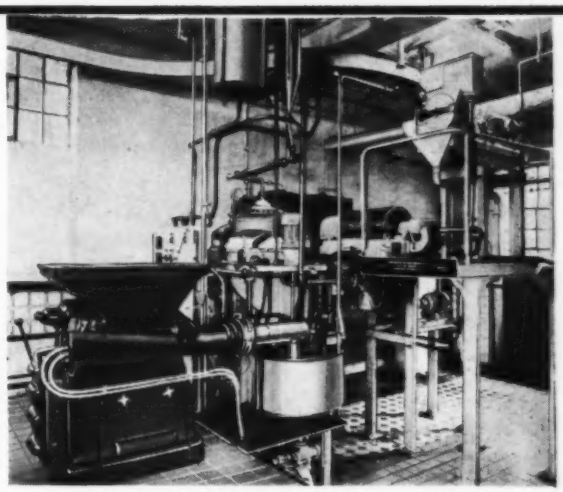

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—a revolutionary machine for sealing all standard guages of **Polythene (Polyethylene), Pliofilm,** and **Heat Sealing Cellulose Films**—gives you these 5 starred advantages.

- ★ Only one sealing action—no skill needed—instant release after seal giving greater speed.
- ★ for sealing both bags and tubing.
- ★ Adaptable for wall mounting for the sealing of bags containing free flowing materials.
- ★ No technical maintenance required.
- ★ Compact and portable—Size 17" × 9½" × 8½"

Price 19 Gns.

For information and demonstration please write or phone:

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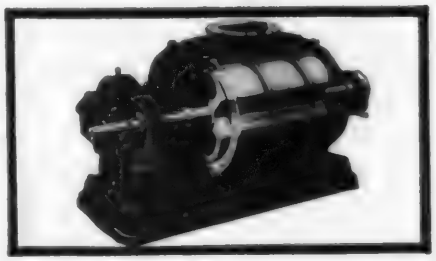
A long blow indeed! Holmes-Connersville Positive Air Blowers have been designed to give continuous (24 hours per day) trouble-free service and are consequently of extremely sturdy construction. This, combined with minimum maintenance and low running costs, makes them eminently suitable for a wide range of applications where air is required at pressures up to 10 lbs. per sq. inch. They are also suitable for low and medium vacuum conditions.

For full details please write for descriptive literature A/39



A cut-away view of an HI Type Blower

W. C. HOLMES & CO. LTD.

Gas Handling Division, Turnbridge, Huddersfield

Telephones: Huddersfield 5280 London: Victoria 9971 Birmingham: Midland 6830

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1½ TONNER

with long life petrol or diesel power unit

BUILT with your needs in mind, the Commer 1½ ton forward control model thrives on the toughest assignments . . . triumphs magnificently over the fierce strain of "stop-start" delivery work. A sterling example of Commer reliability, quality engineered, this lively model — available with chrome bore petrol or diesel engine to choice — gives the utmost economy of operation. Primarily fitted with van bodywork distinctively modern in style, the chassis also accommodates special bodies to suit individual requirements such as the above.

Built stronger to last longer!

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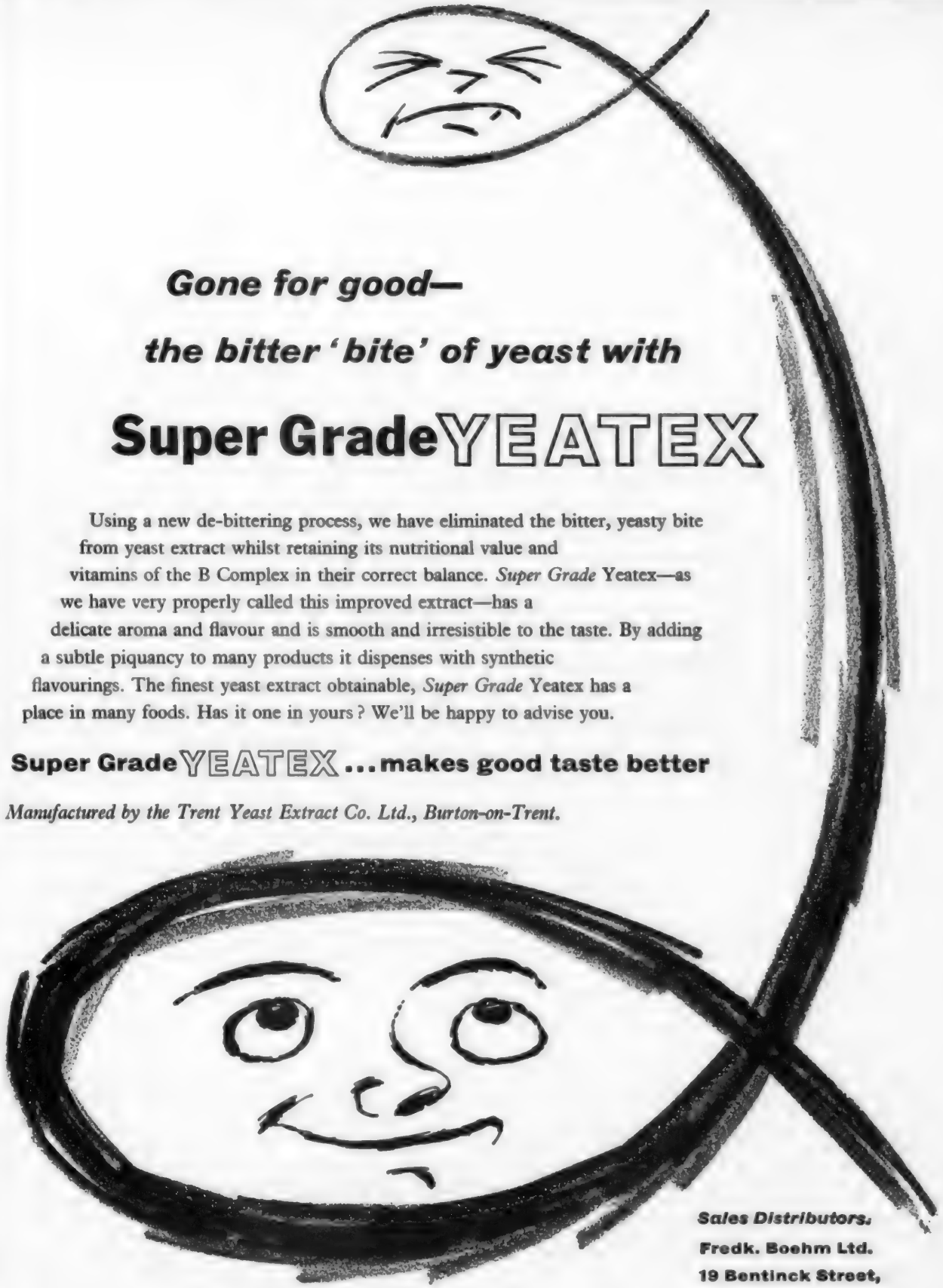

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the bitter 'bite' of yeast with

Super Grade YEATEX

Using a new de-bittering process, we have eliminated the bitter, yeasty bite from yeast extract whilst retaining its nutritional value and vitamins of the B Complex in their correct balance. *Super Grade* Yeatex—as we have very properly called this improved extract—has a delicate aroma and flavour and is smooth and irresistible to the taste. By adding a subtle piquancy to many products it dispenses with synthetic flavourings. The finest yeast extract obtainable, *Super Grade* Yeatex has a place in many foods. Has it one in yours? We'll be happy to advise you.

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Here is a mixer with a difference: the compact solid-looking unit with its gleaming stove enamel finish, the precision-turned shaft, the mixing-head both in stainless steel. *Switch on* . . . A gentle purr from the motor: shaft and head now rotate so smoothly they hardly seem to move.

Such is the 'Universal', a medium-powered semi-portable mixer by Premier Colloid Mills Ltd. who have been making mixing equipment for 32 years, designed to give years of trouble-free service in the cause of quicker dispersions, chemical reactions, solution manufacture, washing, emulsion premixing and manufacture.

Last year, 80% of all orders for 'Universal' Mixers were from firms which were already using one or more of these remarkable machines.

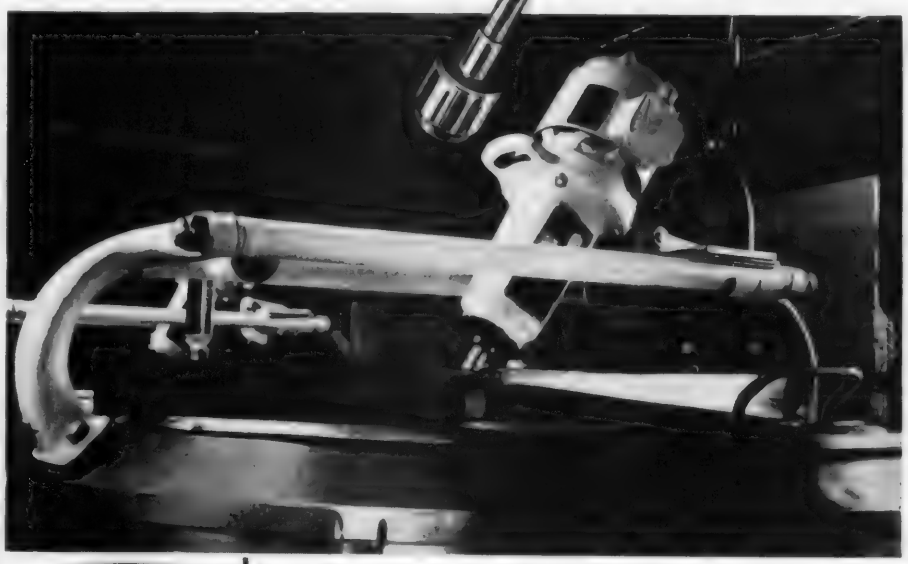
THE UNIVERSAL MIXER

★ *Capacity : 50 to 1,500 gallons according to viscosity.*

★ *Twenty-five variations of power and speeds to suit most requirements can be supplied.*

★ *Marine type propeller, or the patented 'Dispersator' mixing heads are available.*

★ *Flameproof motor range.*



FREE TRIALS WITH YOUR MATERIALS

See how a Premier Machine will cope with your own materials. Experimental tests are easily arranged. There is no obligation. Write or 'phone today.

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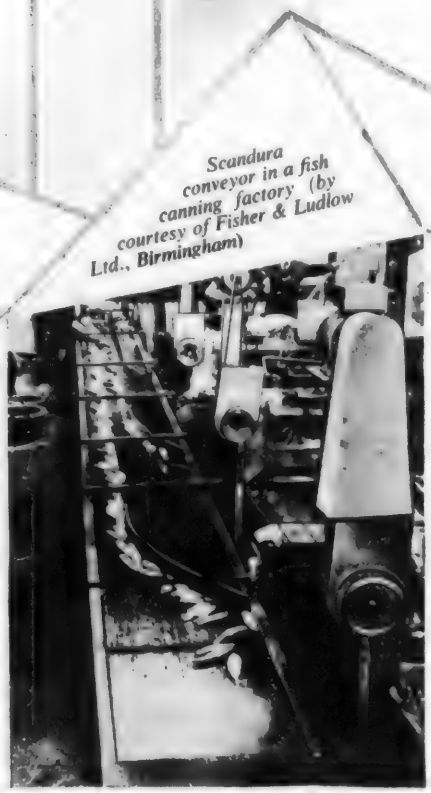
SCANDURA P.V.C. belting

helps the food industry

Cake packing on a 'Motaveyor,' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

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And that's before they submitted this quotation for controlling it. You'll find the laboratory test and site test reports they attach most interesting. Whether their quote is higher or lower, I reckon we're on to something sure—they guarantee in our case 99·1% recovery

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Colt Equipment: 80 S.R.2060 Natural Extractors.

In S.P.D. depots throughout Great Britain, the complex ventilation requirements of these warehouses are being met by Colt Natural Ventilation systems.

The installation of Colt S.R.2060 Ventilators, shown above at the Chelmsford depot, is the Colt solution to an intricate problem concerning the relationship between ventilation and structural insulation ; both of them essential to the products stored.

Every problem Colt tackle receives the same meticulous attention. Colt have practical experience in installing ventilation systems for over 10,500 firms, throughout the world. A Technical and Advisory Staff are ready to adapt this knowledge to your particular requirements.

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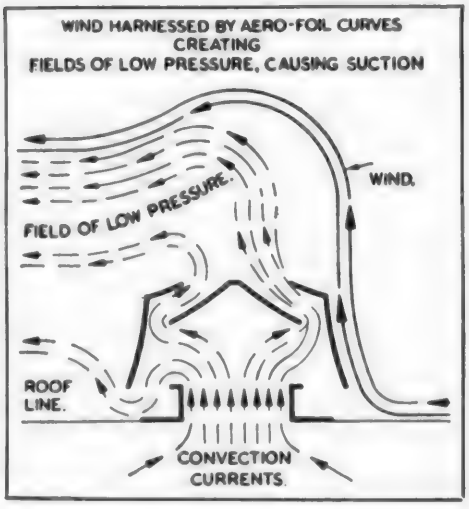

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VENTILATION

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U.S.A. Subsidiary : Colt Ventilation of America, Inc., Los Angeles.
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Attractive, colourful gelatin capsules have exceptional sales appeal, long shelf life and are an economically sound way of packaging and presenting many food products. They are soluble and edible—or can be used as squeeze-out containers; they protect their contents from contamination and deterioration.

R. P. Scherer can either capsulate materials supplied in bulk by you or produce, entirely, a product from your formula.

In the extensive laboratories and plant at the Slough production unit of the world-wide Scherer organisation, experiments on your new or current product can be carried out and a trial batch of capsules supplied without cost or obligation NOW.

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[B]

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Maltsters for more than a Century

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Yes, this is an ACTION photograph of a high-powered salesman at work. For "Cellophane" cellulose film is on the job, enriching appetite-appeal with its own sparkle, winning customer-approval, making those important "impulse" sales.

The housewife likes the *visible* assurance of freshness and hygiene that "Cellophane" brings, and appreciates the convenience of easy-to-carry-away packs. Above all, she recognises that a transparent "Cellophane" film package is a guarantee of the manufacturer's absolute confidence in his product (he has nothing to hide), and therefore a guarantee of quality.

There's nothing like "Cellophane" film to keep food fresh and to protect it from dirt, dust and grease.

For extra packaging convenience use "Cellophane" film bags. And for putting over your name and sales-message, there's nothing to equal colour-printed "Cellophane" film. We can put you in touch with the best film-printers and bag-makers—such as our associated company, Colodense Limited of Bristol.

In particular, the new MXXT "Cellophane" — the most moistureproof film in the world—will guard the freshness of the most "difficult" products for long periods. The exceptional sparkle and freedom from wrinkling of MXXT film gives packs special eye-appeal.

Write to us today, and find out how "Cellophane" can improve your business.

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"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them.

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This machine was supplied to Messrs. J. Sainsbury Ltd., London, for washing a wide variety of aluminium containers for perishable foods.

Dawson washing plant is used in every branch of the Food manufacturing industry and standard machines are available for washing trays, cans, jars, bottles, moulds, dishes.

We shall be pleased to send one of our technical representatives to advise you on any cleaning problem.

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DAWSON BROS. LTD., GOMERSAL, Nr. LEEDS

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ON QUALITY

The finishing touch to a quality product is the R.O. Seal. With or without the Pilferproof feature, the R.O. closure adds distinction and ensures satisfaction. The secret is that the R.O. Seal is not threaded until applied, when it is **rolled on** and takes the identical screw shape of the individual container. Special R.O. machines do this for you - and complete the filling-labelling line without interruption of flow. What a fine idea this R.O. Seal is !

...the R.O. seal

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commendations
press most suited
to your needs.
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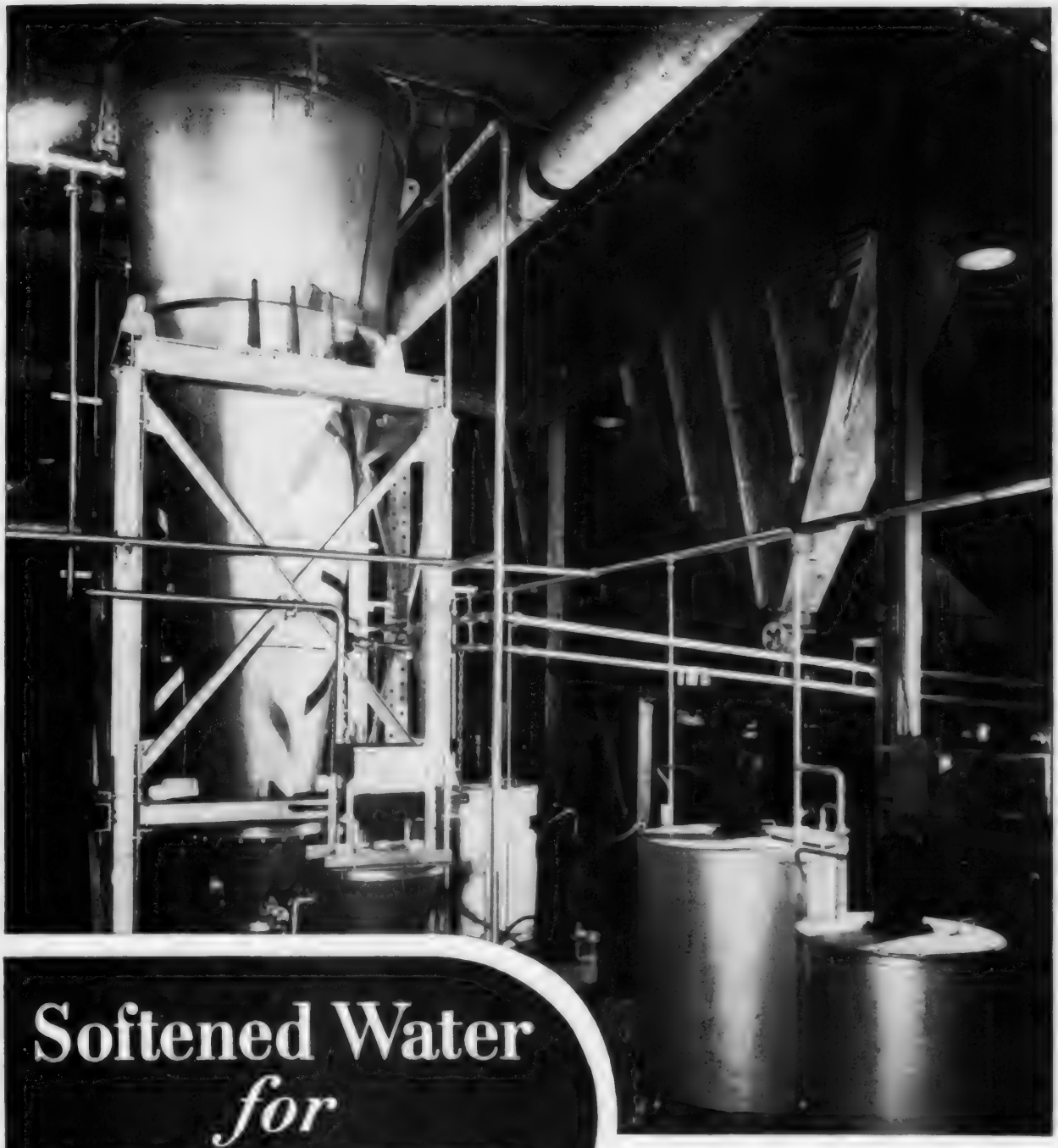
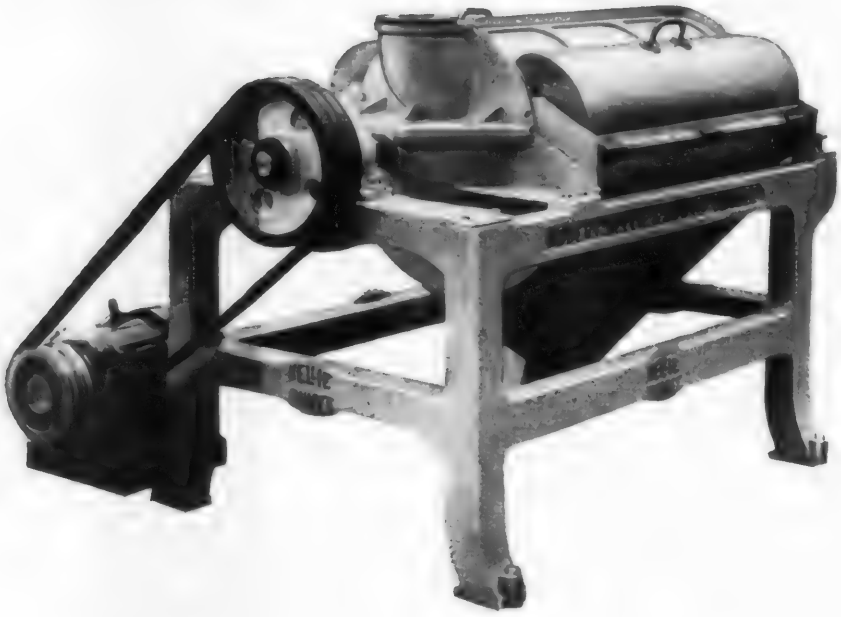


Softened Water *for* BOILER FEED by PERMUTIT

Consistent zero-hard softened water for boiler feed is supplied by "Spiractor" cold lime softener followed by a Permutit Ion Exchange softener. This is only one of a range of Permutit plant designed to supply correctly treated boiler feed. If you require further information on Permutit boiler feed water treatment plant, please write to:—

The PERMUTIT COMPANY LTD. Dept. W.L. 272, Permutit House, Gunnersbury Avenue, London, W.4

Telephone: CHIswick 6431



PULPER

HEAVY DUTY PULPING MACHINE

A sturdy reliable machine with a tremendous capacity, the Kellie Heavy Duty Pulping machine can easily handle up to 20 tons of material per hour. Food products such as tomatoes, apples, prunes, plums, figs, oranges, berries etc. deftly cycloned, sieved and reduced to a liquid or semi-liquid state.
The roughage—skins, seeds, cores and other residue is efficiently strained off. In certain cases where it is necessary to pass the seeds and some chunks into the finished products, this is effectively controlled by fitting a suitable perforated pulping screen.
The Kellie Heavy Duty Pulping machine is capable of dealing with 10 to 20 tons per hour according to the nature of the product. The machine is equally efficient as a rougher or finisher with the use of interchangeable screens.

Send today for full particulars.

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ROBERT KELLIE & SON LTD., DUNDEE, SCOTLAND

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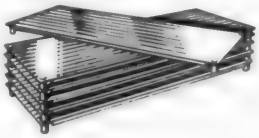
The CHIEF ENGINEER says—

'Vermin and Dirt are excluded by WARCO easy-to-handle

Stacking Bowls'



An extremely robust container of 16″ diameter · 8½″ or 12″ or 15½″ deep—5, 7½ or 10 gallons capacity respectively. Manufactured from 10 gauge aluminium with drop down, or fixed, side handles and stacking feature. Used in a wide variety of trades for the conveying or storage of all kinds of wet or dry foods. All sizes interstack and lids can also be provided.

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Reg Trade Mark
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First Choice for Aluminium Equipment

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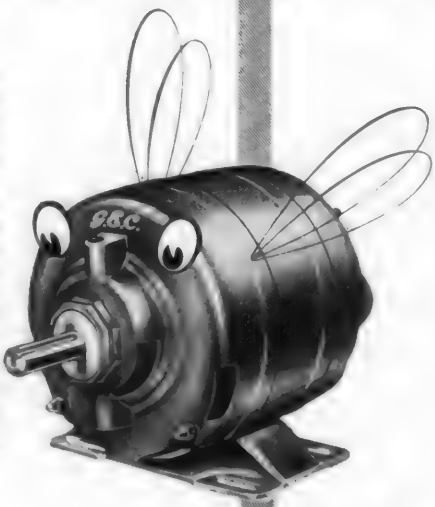
put power where you want it

Power for many purposes. Power to drive your own plant efficiently, or to add further distinction to the equipment you make and sell. Power. As much (up to 1 h.p.) or as little as you need, in a wide range of mountings, but always with the reliability for which all G.E.C. engineering is famous. Power, from sturdy, dependable G.E.C. Fractionals. Most sizes and mountings are held in stock—that's another advantage of dealing with the G.E.C.



G.E.C. manufacture many types and sizes of fractional motors for light industrial and domestic drives—whether for your plant or products our engineers will always be pleased to help you choose the right motor for the job.

Fully detailed illustrated publication on application.

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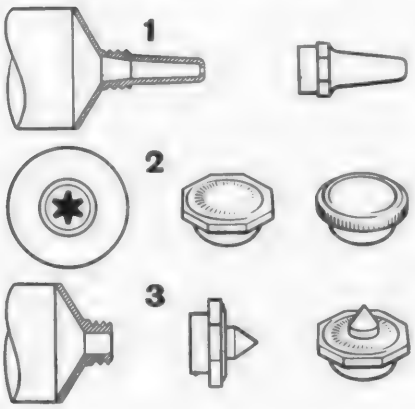
THE GENERAL ELECTRIC CO. LTD. MAGNET HOUSE, KINGSWAY, LONDON W.C.2

PUT YOUR FOOD IN TUBES
WITH '**DALE**' FEATURES



special nozzles

Customer and consumer demand is catered for in every way. John Dale Limited offer as standard a variety of special nozzles without tool charge for special purposes. Examples are:—

1 The elongated nozzle for piping with icing or jellies.

2 A conventional nozzle with a star shaped orifice for fancy decoration on biscuits, cocktail savouries, cakes, etc.

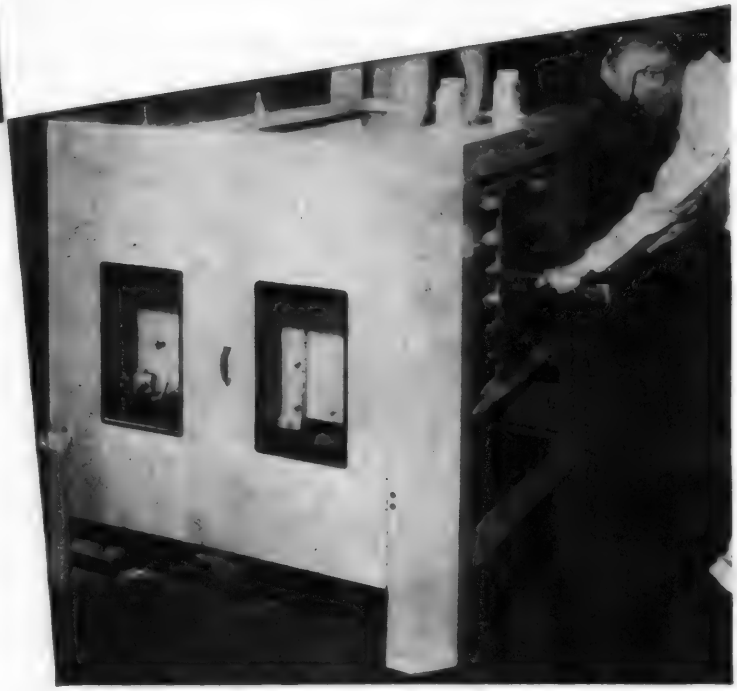
3 The thin membrane sealed nozzle. This Dale development offers you an Aluminium tube which with its sealed 'Easy-pierce' nozzle is ideally suited to products which must be kept airtight. This nozzle on a tube with one of Dale's special endseals is the perfect pack for any product which is inclined to seep. The nozzle is, of course, easily pierced by means of the spiked cap as illustrated above.

JOHN DALE

'the tube people'

ENTERPRISE 1272
BURY 5295

Sifting problems?



Not with the Simon Junior Sifter. The persuasive rotary motion of its horizontal sieves gives a gentle but positive separation of powders and granular materials. It is totally enclosed in a metal body and therefore dust-free.

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Then use the Simon vibratory Velofeeder. It gives a controlled accuracy of feed on all solids from powders to 2" lumps. Adjustments are made in seconds from high to low discharge rates within a 400—1 ratio.

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IT'S THE Lacquer THAT COUNTS

Yet another addition to the Coates range of Preservex lacquers. The Lacquer to guard against blown cans, can corrosion, and sulphur staining—in fact, to be recommended for all types of canning.

Coates **PRESERVEX**
UNIVERSAL LACQUER

COATES BROTHERS INKS LIMITED
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(Manufacturers of the celebrated
HARRIS WILTSHIRE SAUSAGES
—as good as their famous bacon)

praise their

SEYDELMANN SUPER CUTTERS!

✳ *Read what they have to say*

"We have found the Seydelmann cutting machine a first rate job in the preparation of our top quality products. It has given us high speed production with a very low rate of rise in temperature of the material being chopped and the maintenance required has been very low indeed".

C. & T. HARRIS (Calne) Limited

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new test kitchen . . . new extended laboratories!

Crampton's new extended Research Laboratories and Test Kitchen ensure scientific control for purity, quality and consistency, and mean regular product tests in user conditions.

Research and food development link up in the production of high class ingredients for sausage and meat products.

Additionally, for their manufactured foods, Crampton's carry out frequent analytical tests to guarantee the consistency and purity of all the raw materials used.

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Telephone: WYTHENSHAWE 2272 (4 lines) *Telegrams: 'NUTMEGS' Manchester*

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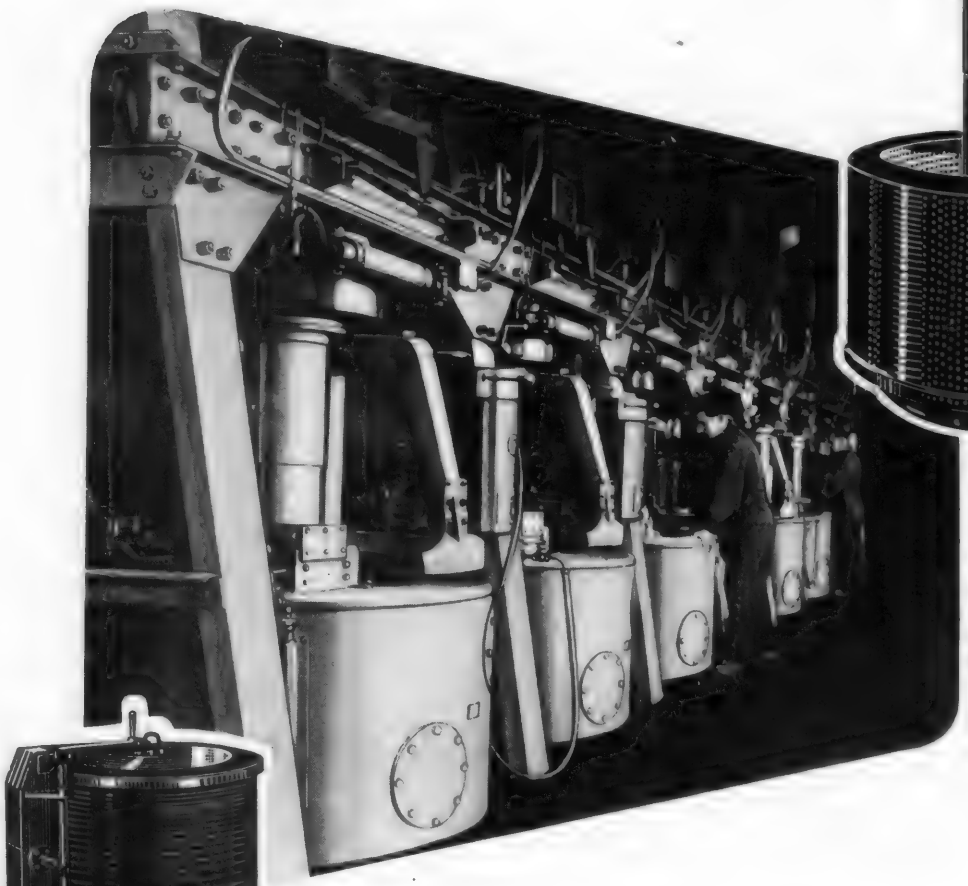
an extensive range–

of **HIGH-SPEED CENTRIFUGALS** for rapid, hygienic food processing made of suitable corrosion resisting materials



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Over 90 years experience in the specialised field of centrifuging enables us to recommend the most satisfactory equipment for increasing your production

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buttoned up by

MEASUREMENT

Batch control for a liquid mix nowadays requires precise amounts of several ingredients to be dispensed in exact quantities. Too often this job still depends on a man with a bucket and a mind of his own. MEASUREMENT have replaced this uncertain method with a system of metered control. The quantities are pre-set on a dialled control panel and supplied to the mix, from a remote control point if necessary, at the press of a button. Quantities are precise, records are automatic, control is complete and the bucket is out.

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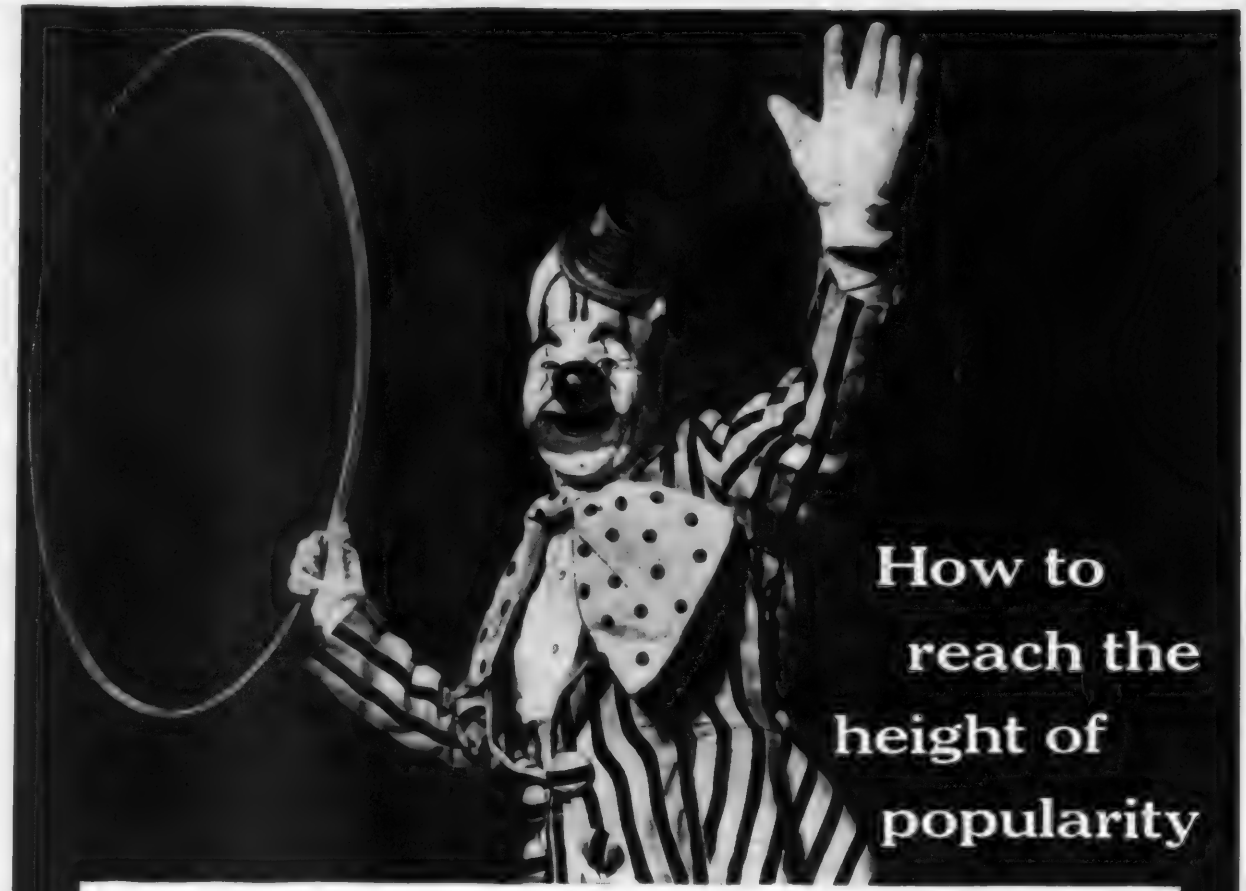
Terminal House, Grosvenor Gardens, London, S.W.1. Telephone: Sloane 0111/4. Cables: DISC, London.



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IT'S THE TOP QUALITY PRODUCT that heads the popularity poll these days. And a top quality product needs top quality ingredients.

Sometimes you have a choice of ingredients. But not with milk. For that irresistible *fresh* flavour you must have GOLDEN GLOW. It's not just the experts who can tell the difference. The public may not know that it's GOLDEN GLOW that makes a product so good, but they *do* know a good thing when they taste it !

GOLDEN GLOW has more virtues than first-class flavour. It's economical. It's so much easier to store. And it's so simple to handle.

If you want to know more about GOLDEN GLOW, 'phone us for a sample today.

Golden Glow English Made Dairy Products

Spray and Roller Process ; Full Cream and Separated Milk Powder ; Evaporated Milk and Cream ; all packed in containers to suit your requirements.

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the packaging material with an infinite capacity for taking strains

No other packaging material has so many positive advantages as Fablothene, super-transparent, tear-resistant polythene that's ideal for packaging an almost limitless range of wet or dry goods either in bulk or as individual retail items. For Fablothene stands up to all the stresses and strains of storage and selling . . . it keeps *out* water, damp and dust . . . it keeps in flavour and freshness and it has an extremely low moisture-vapour transmission. What's more, Fablothene *shows* what it *preserves* . . . makes everything look fresh, appetising, irresistible! Fablothene bags open easily and can be used successfully in conjunction with automatic packaging systems.

TIME OR TEMPERATURE DON'T BOTHER FABLOTHENE. Fablothene is a single substance. It contains no toxic plasticizer, which after a time could migrate from the packaging to its contents, and in turn allow the polythene to become hard and brittle. Likewise, Fablothene remains flexible over a range of temperatures from 40°C to 100°C so it can be safely used for deep-frozen foods and export packaging. In the case of the latter, special heavy-quality Fablothene is manufactured for export and other circumstances where conditions are particularly rough.

CHEMICALLY RESISTANT. Fablothene is quite unaffected by dilute acids and only slightly by concentrated acids. It is also proof against fungi, salt and sea water and will not support mould growth.

FABLOTHENE CARRIES YOUR MESSAGE. We supply Fablothene ready-printed in up to four colours to a design supplied by you or our own studio. Ask to see specimens. They're outstanding! The Fablothene range includes layflat tubing, sheet film and bags in thicknesses from 120 gauge to 500 gauge. Layflat widths are from 2″ to 48″, with other widths and gauges produced to special order. **Before you decide on another packaging product, you must see samples of FABLOTHENE.**

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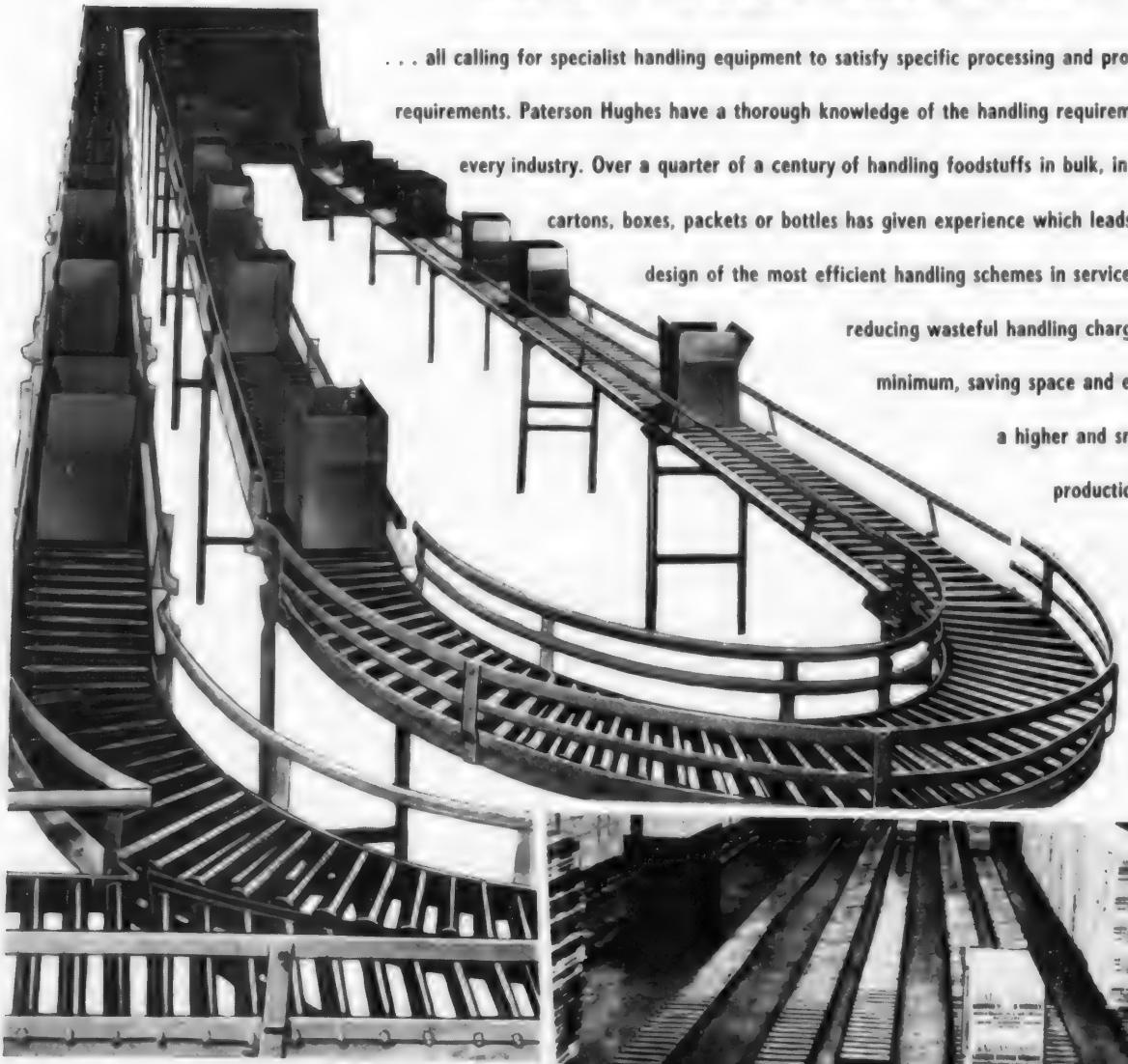

Photograph by kind permission of Rowallan Creamery Ltd., showing Gravity Roller handling Margarine

Gravity rollers handling Liqueur Scotch Whisky: photograph by kind permission of George Ballantine and Son Limited

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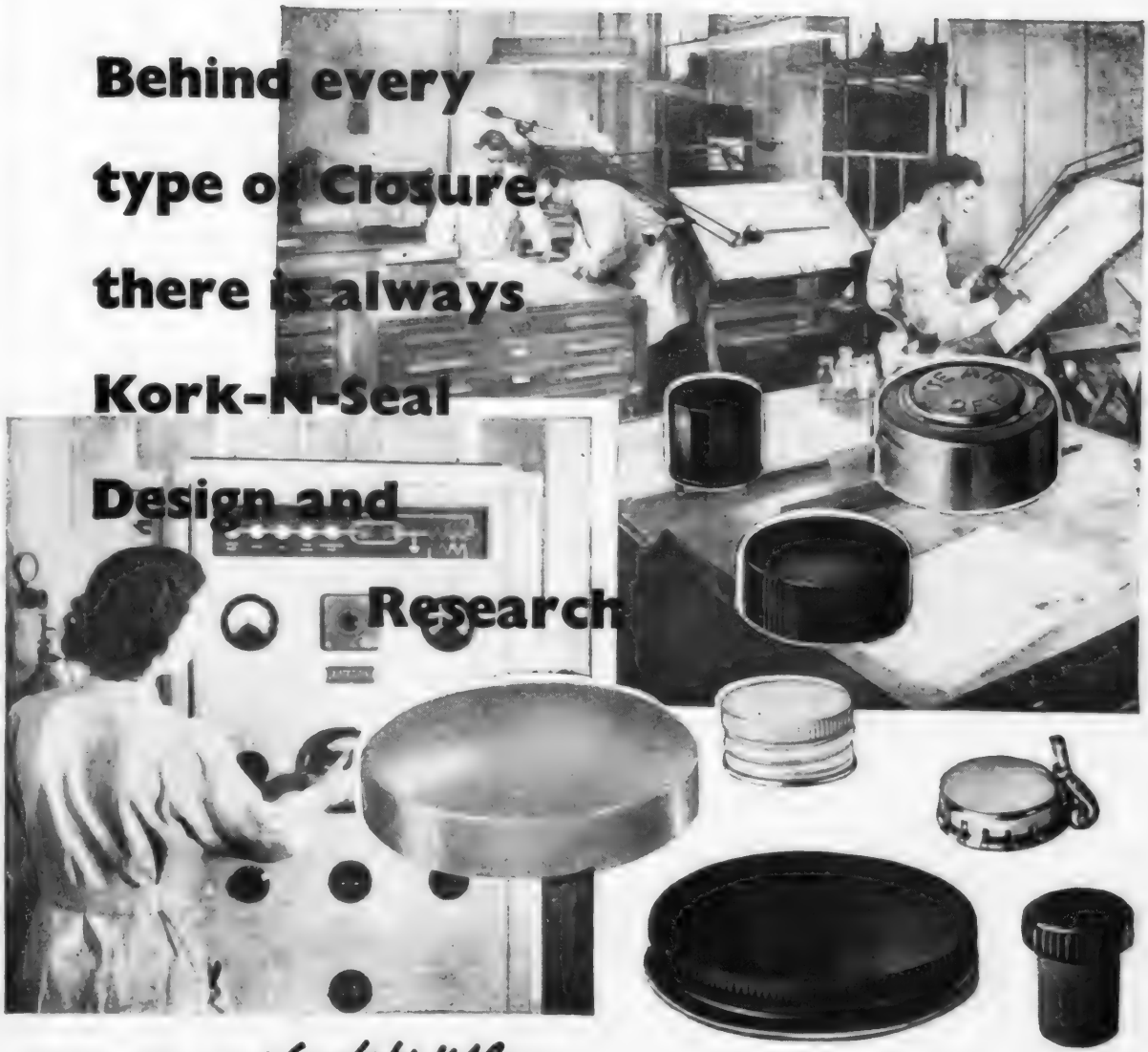

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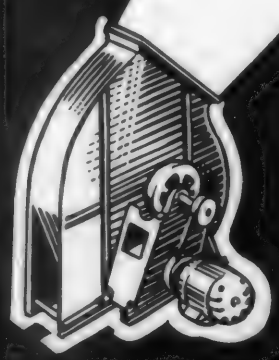

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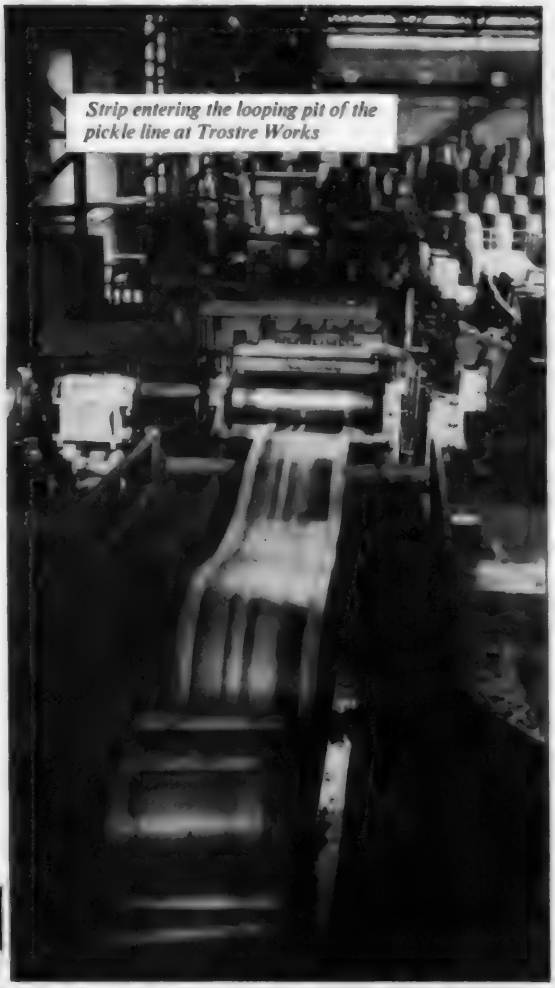
Tinned strip entering the cutting and classification section of an electrolytic tinning line



Strip entering the looping pit of the pickle line at Trostre Works

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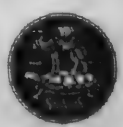

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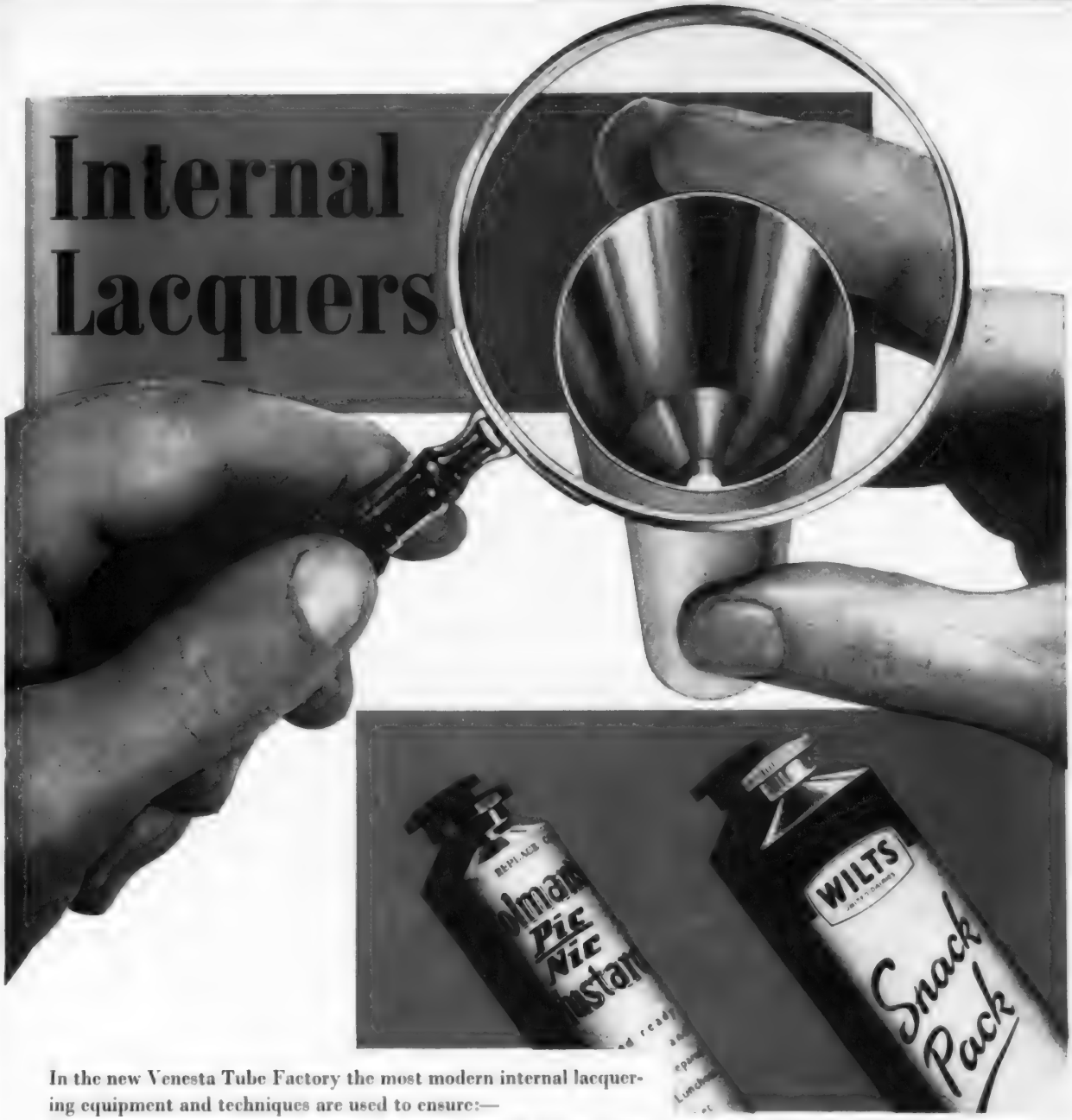

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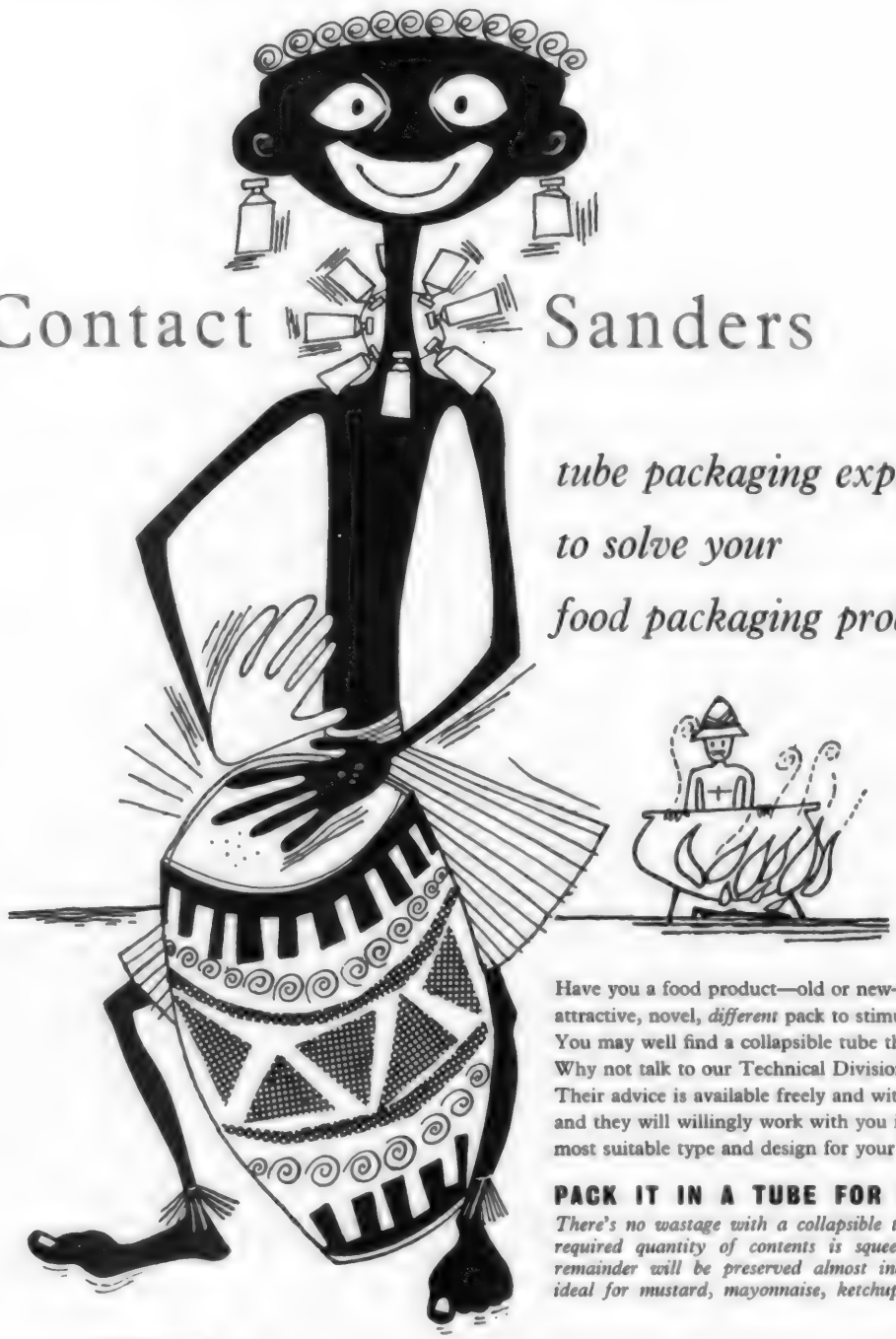

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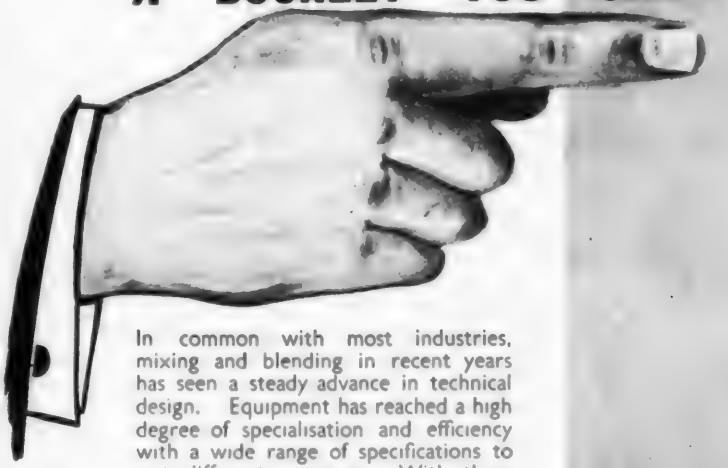

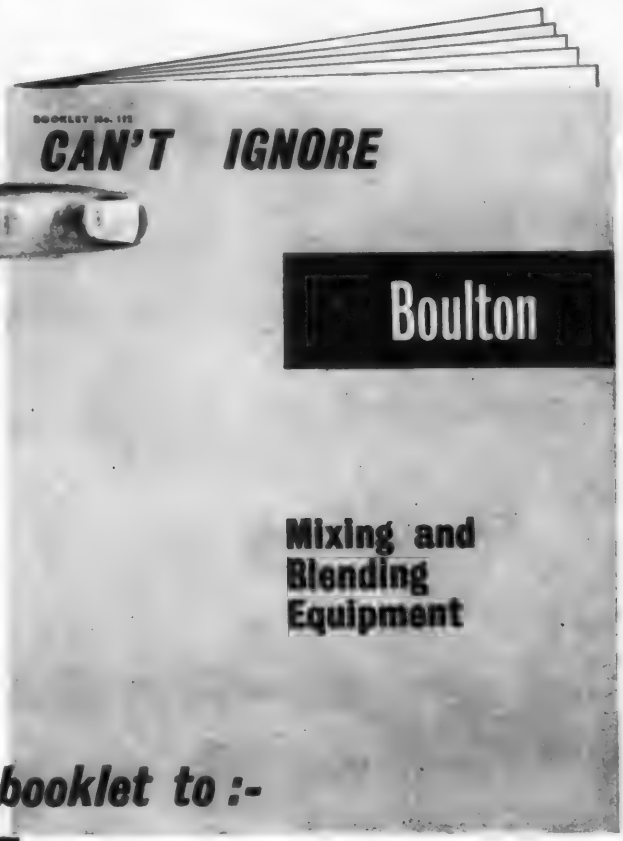

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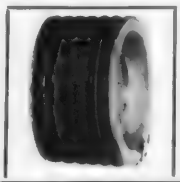

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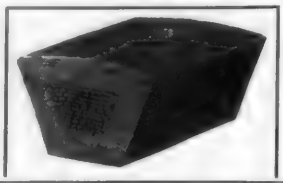

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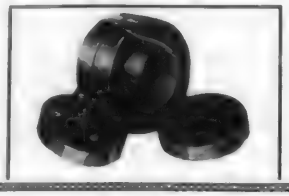

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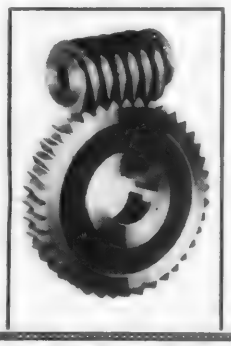

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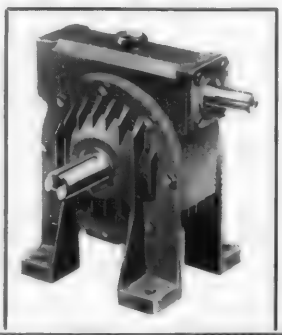

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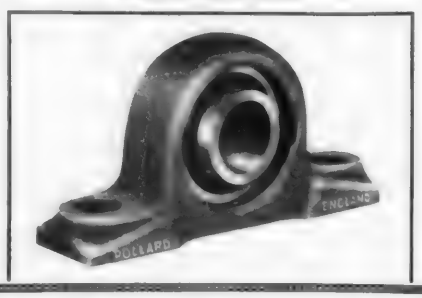

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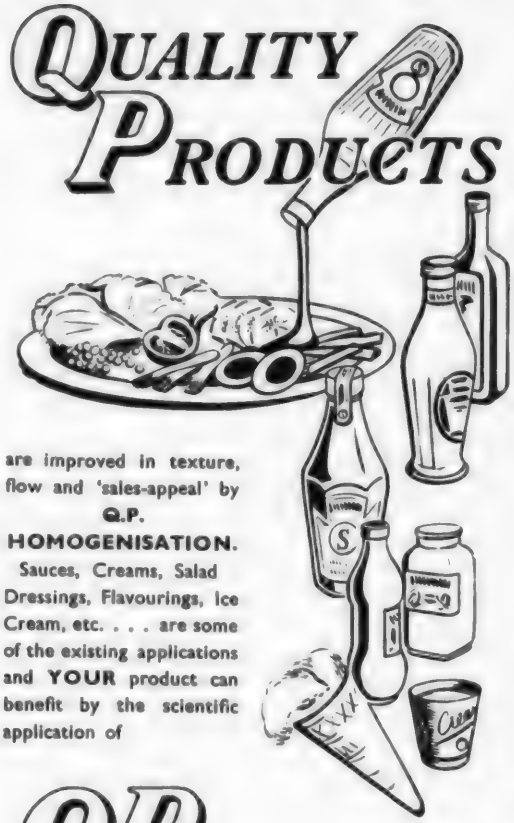

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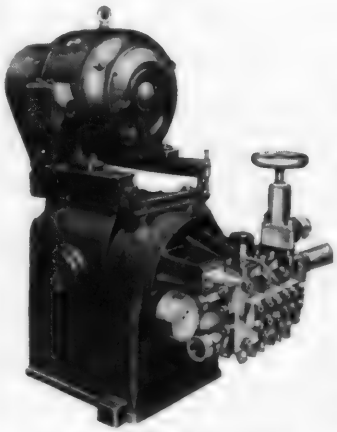

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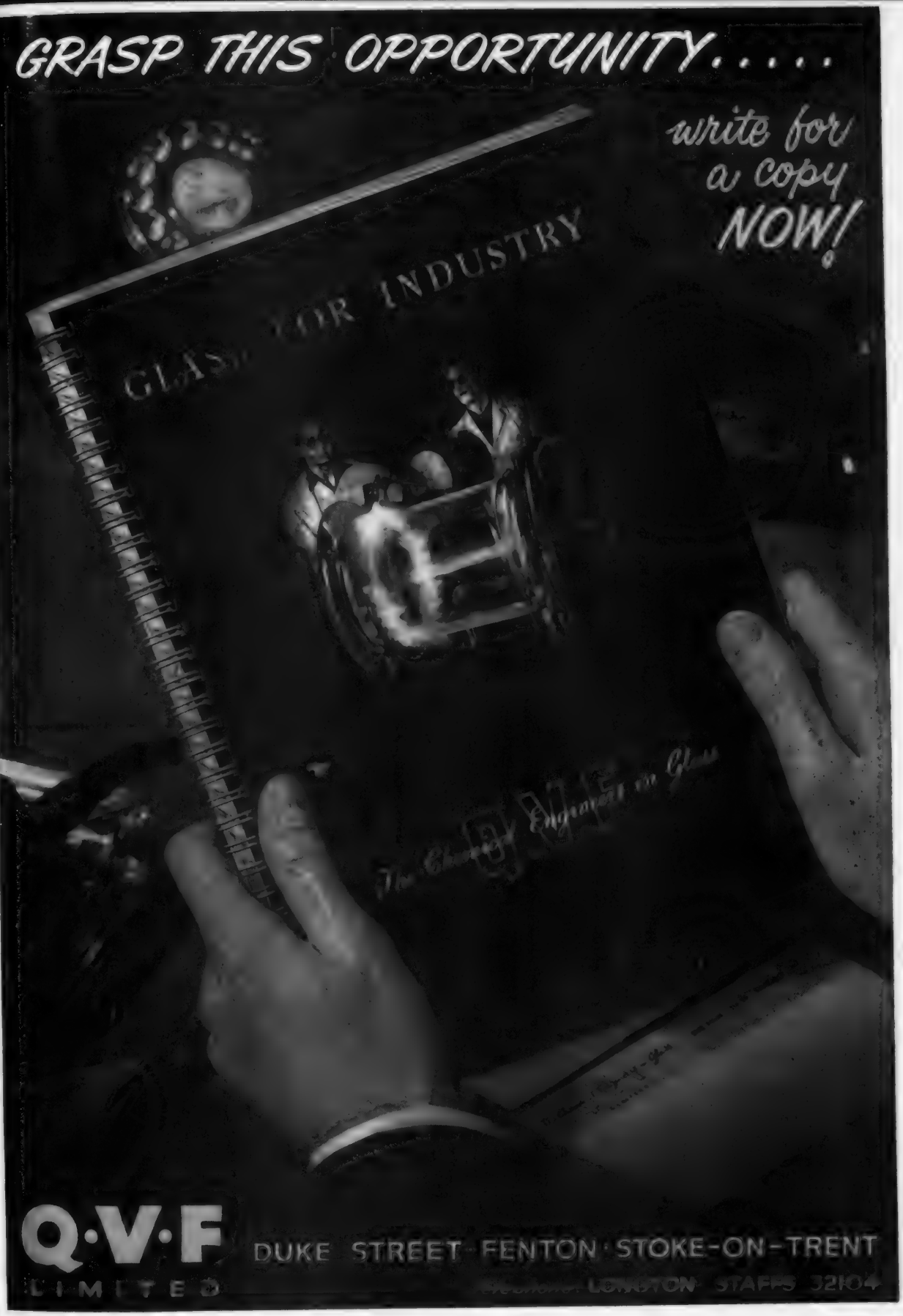
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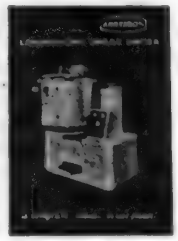

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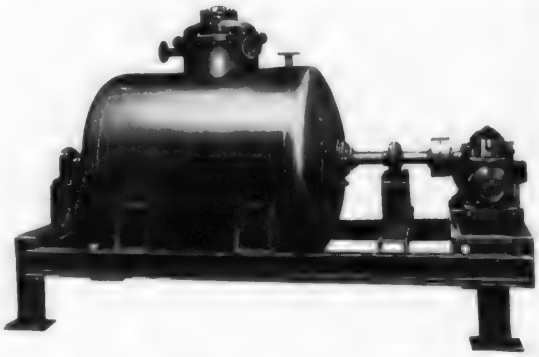

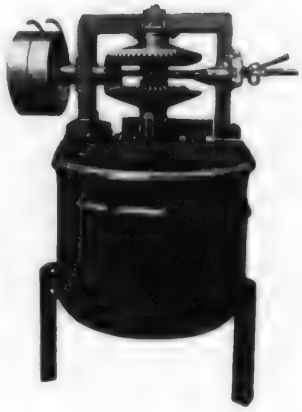

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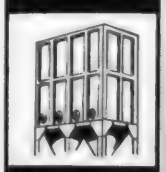

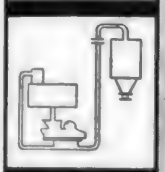

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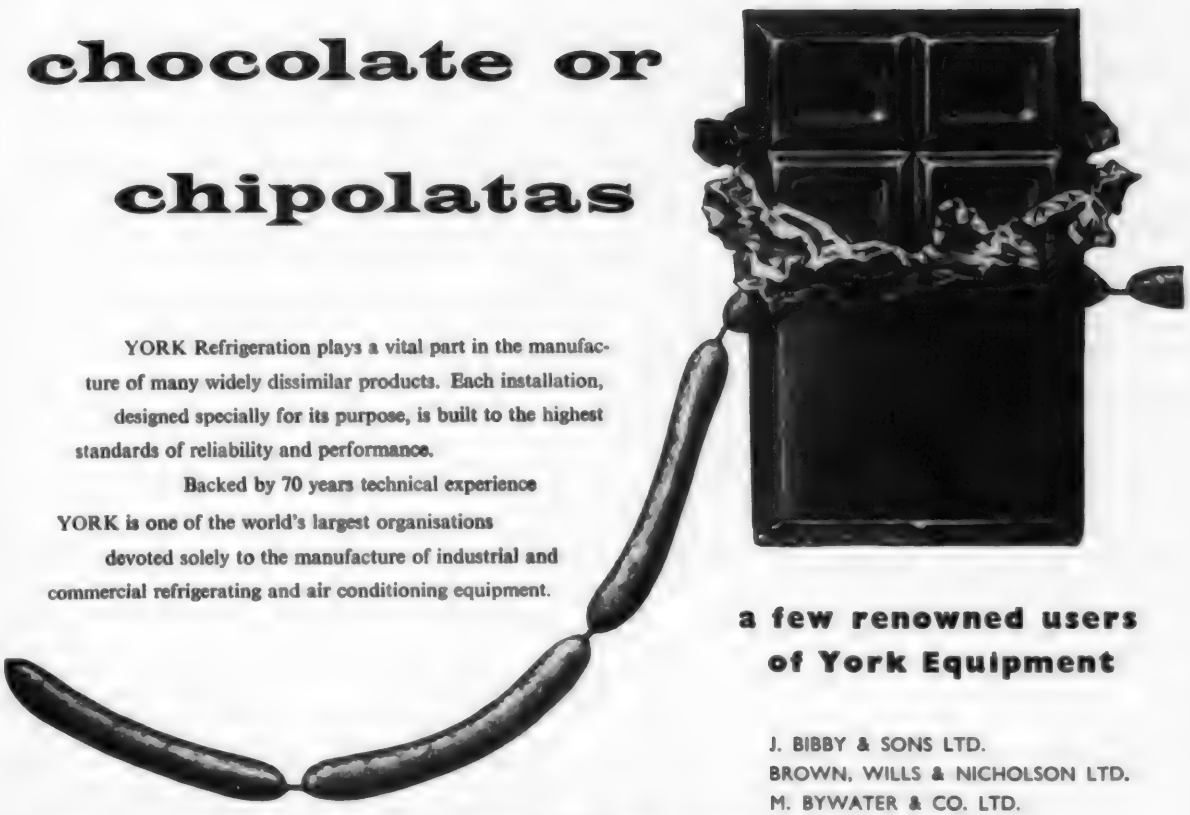

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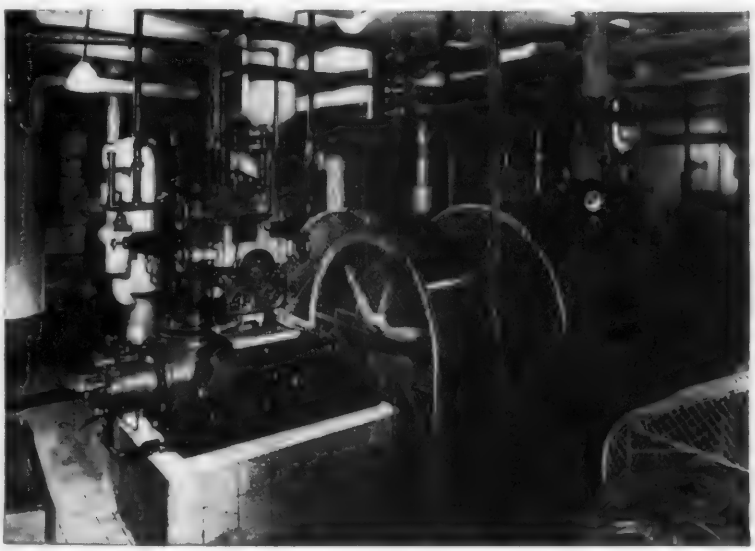

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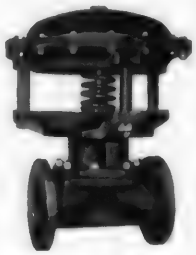

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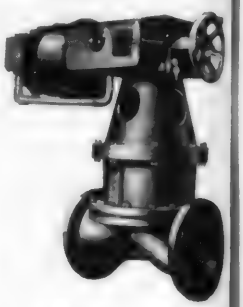

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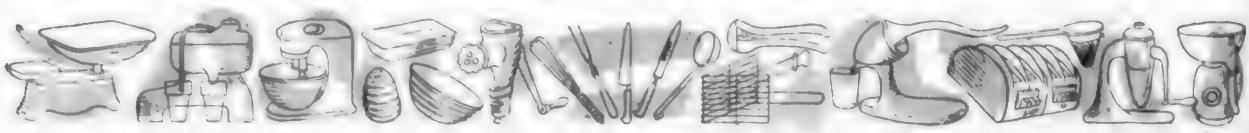

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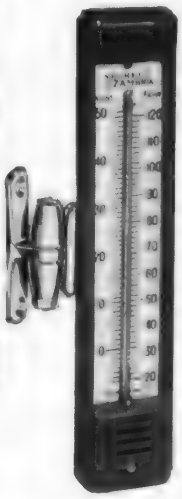

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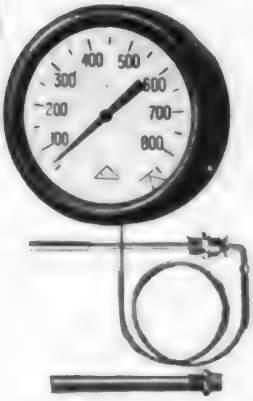

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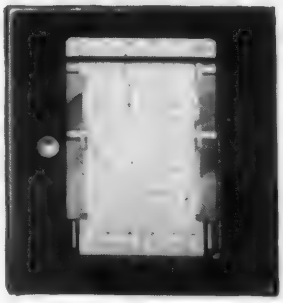

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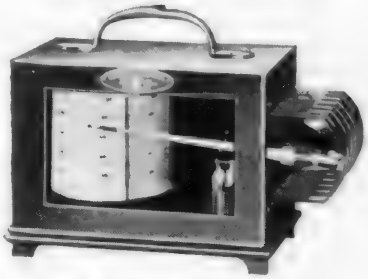

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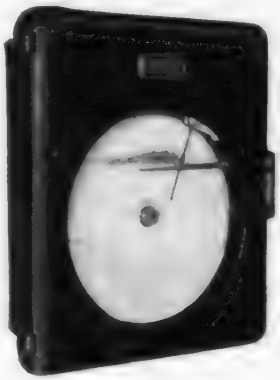

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Volume XXXIII. Number 1 Published Monthly January 1, 1958

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FOOD MANUFACTURE

Vol. XXXIII, No. 1 January 1, 1958

Packaging—the final sales appeal

THE time is not long past when good food, whether of the uncooked or processed variety, was sold largely on its appearance or on the reputation of the manufacturer and the shopkeeper involved. Short as has been the intervening time, however, this state of affairs can no longer be said to apply. A reputation for quality goods is, of course, of enormous value, whether on the part of the retailer or the manufacturer; but the attractive presentation of goods is assuming an ever-greater importance in their successful marketing, and food packaging is in consequence becoming one of the most important branches of the food manufacturer's activities.

This is clearly reflected in the continued growth in the sales of prepackaged foods. It is estimated, for example, that the sale of prepackaged fruit and vegetables will reach 200 million packs in 1958, an increase of 2,000 times on the figure in 1954. According to a report in the *Financial Times*, one Brighton firm is already sending out peeled potatoes in polythene bags to restaurants and hospitals, where their rapid use enables them to be cooked before deterioration occurs, and if efforts now being made to secure amendments in the preservative regulations are successful, the sale of peeled potatoes, and even of ready chipped potatoes, prepackaged and suitably preserved, can be expected to spread to the retail market.

Meat, too, is being prepackaged in increasing quantities, and this practice is said to have increased meat sales by as much as 25% in those stores where it has been adopted. Fresh fish is one of the latest additions to the range of food being marketed in this way.

The growth of quick-frozen foods is adding a further stimulus to the trend towards prepackaged foods, and modern standards of hygiene are also playing their part. Perhaps most important of all, however, is the estimated fact that only one woman in five now goes shopping with a shopping list. The rest are guided largely by eye appeal in their selection of purchases, or in their desire to purchase a particular commodity at all, and in capturing the eye of either the thoughtful shopper or the impulse buyer the attractively packaged article is showing itself an easy winner.

On p. 22 of this month's issue of FOOD MANUFACTURE, we present an illustrated review of developments in food packaging during the past year, including descriptions of some of the outstanding new materials and machines which are now available for this purpose.

Aluminium cans offer further challenge

A NEW drawing technique for the commercial production of seamless aluminium food cans has been developed by the Kaiser Aluminium and Chemical Corporation. The company's container plant at Wanatah, Indiana, is now at work producing an initial order of 5,500,000 of the aluminium food containers for the Kraft Foods division of National Dairy Products Corporation. The new drawing process, one of several aluminium can production methods devised by the Kaiser company, produces a seamless can body and bottom in one piece by the pressing of a flat disc of sheet aluminium on to a die.

The Kraft cans, which will be used to package the company's grated cheese, are said to be the first food cans to be made of the light metal on a large scale in the United States. Looking to the future of aluminium cans, D. A. Rhoades, Kaiser's vice-president and general manager, said that conversion of only 10% of the existing can market to aluminium would require 200,000 tons of the metal, or 10% of the total aluminium industry's capacity.

Major advantages cited for the aluminium cans include high protective qualities, attractive appearance, light weight, which will reduce transport costs, and an ability to be opened easily. Although unit cost initially may be higher in some instances, the aluminium can, Mr. Rhoades said, will be entirely competitive with other types of containers where it is possible to make effective use of aluminium's unique properties.

With the tin-plate supply position in this country still by no means stabilised, food manufacturers will watch with interest the progress now being made in the development of aluminium containers which can compete economically with the traditional tin can.

Colours for safety

RENEWED efforts are being made to reduce the number of industrial accidents. The practice of painting obvious hazards and safety equipment in bright colours has long been followed in many factories, but the system of colouring used has been by no means universal, and this has inevitably led to confusion when workers have moved from one factory to another. In an attempt to remedy this, the British Standards Institution has now issued recommendations (B.S. 2929) for a unified system of *Safety Colours in Industry*. This system is rendered all the more significant by the fact that it is in substantial agreement with a code of safety colours shortly to be recommended for world-wide adoption by the International Organisation for Standardisation. There is therefore every hope that there will grow up throughout the world a unified system of easily recognisable safety colours.

The British Standard recommendations include the use of three main colours—red, orange-yellow and green. These are to have essentially the same significance as in traffic control systems—red for acute danger, orange-yellow for a warning of danger, and green for the identification of safety equipment. Contrasting colours are used with the three main colours to form patterns which make for easier visibility. Thus a red and white chequered pattern would be used for the door of a store containing inflammable spirits such as petroleum. Other examples of the recommendations include the use of red for the identification of buttons, wires or handles to be used in an emergency to stop machines, and for fire-fighting equipment; orange-yellow with diagonal black stripes to give warning of risks arising from changes in floor level, floor or head obstructions, and open machinery guards; green for fire and emergency exits.

Representatives from a large number of British industrial organisations have co-operated in the formulation of these recommendations, and it is to be hoped that their use in practice will help to reduce the heavy toll of industrial accidents.

Diet foods—a $250 million market

ONE of the fastest-growing branches of the U.S. food industry is said to be that concerned with the preparation of diet foods, for which there is now a $250 million market in the U.S.A. According to Mr. Alan Randall, vice-president of Monarch Foods, a unit of the Consolidated Foods Corporation, the sales of diet foods have more than quadrupled in the last four years, and the annual sales volume now outpaces that of baby foods in its share of the total food products market. Mr. Randall forecasts, moreover, that as a result of widespread supermarket merchandising these sales would continue to grow.

Explaining this very rapid increase in the sale of diet food lines, he said that some 75 million Americans are now diet-conscious. This vast market, he said, is drawn from "self-imposed" dieters, who want to lose a little weight or to keep their present figures without embarking on the rigours of a full-scale diet. These two groups, he said, make up the mass market for good-tasting diet foods of low calorific content. Additional diet food customers include medical cases such as heart patients, diabetics and geriatrics.

The British medical profession is anxious that as knowledge of the principles of nutrition and dietetics spreads in this country it should be accompanied by an increased discrimination on the part of the general public in the selection of balanced meals, with physical exercise playing an increased part in the prevention of over-weight, rather than by a flight to any specialised dietary foods. None the less, it is interesting to speculate on what the reaction of the British public will be if and when the consciousness of the dietary value of individual foods ever reaches the level now pertaining in the U.S.A. Should it follow the American pattern, the potential market for dietary foods in this country would also appear to be enormous.

What size of pig?

THE competitive pressure of imported Danish bacon, subject now to a 10% *ad valorem* duty but to no quota restrictions, is forcing the British pig industry to serious consideration of how the challenge can best be met. Questions of tariff protection and price support apart, the industry as a whole would appear to be faced with two alternatives. It can modify the pigs being bred, so as the produce bacon pigs as uniform in size and quality as those the Danes are themselves producing; or it can modify its curing and manufacturing techniques the better to utilise the types of pig which can most economically be raised in this country.

Each alternative has its advocates. If the traditional Wiltshire cure is to maintain its almost universal popularity, then steps will certainly have to be taken to develop more uniform bacon pigs. The Danish breeders have carried this specialisation to the extent of developing a single breed of bacon pig, designed to give as little fat as is reasonably practicable, and the Danish Ministry of Agriculture has recently announced new grading and selection standards designed to bring about further improvements in the already high quality of Danish sides.

Not everyone in the industry subscribes to the idea that the future of British bacon necessarily lies

in the Wiltshire cure, however. With more and more bacon being sold in a sliced, prepackaged form, the side of bacon is no longer the unit receiving public appraisal, and it has been suggested by some authorities that it might well be dispensed with. In a recent article* advocating the wider use of larger pigs, Mr. H. R. Davidson, Vice-President of the British Society of Animal Production and a former head of the Pig Department of the Rowett Research Institute, has discussed ways in which heavier pigs can be more efficiently utilised in the modern meat products factory. Pointing out that rashered bacon now accounts for only about one third of the total consumption of pig meat, and that the demand for sausages, pork pies and luncheon meat is growing every year, he cites the example of T. Wall and Sons (Meat Products), Ltd., and T. Wall and Sons (Handy Foods), Ltd., who have now developed their production programmes on the basis of the heavier pig. Only such cuts as are required from the back, the shoulder and the ham need be cured, and the rest of the meat can be used for manufacturing a range of prepared commodities, in which it is claimed that the extra fat of the larger carcase may be an advantage rather than a liability.

Certainly he produces convincing figures to support his argument that larger pigs are more economical to rear, and a better proposition for the British farmers as a whole. Only a little over two years ago 67 different breeds or crosses of pigs were recommended as being suitable for British conditions, and although most of these are not reared on a large scale, at least seven major breeds exist, each with its advocates and each with its advantages for different conditions of mixed farming. The adoption of only one or two breeds on a nation-wide basis would therefore be a very large-scale enterprise.

On the economic side, Mr. Davidson challenges the view that heavier pigs are more expensive, weight for weight, to produce. He quotes the results of two series of experiments, one performed recently and the other some 30 years ago, which show that the unit dead-weight cost of producing pigs of 280 lb. live weight is only 87% that of producing pigs of 140 lb. live weight. He contends that this more than compensates for the decreased unit price which the heavier carcases will command, and suggests that the efficient utilisation of the larger pig in a mixed products factory should in any case eliminate the essential difference in unit value between the large carcase and the small.

Whether these views will find wide acceptance throughout the pig industry is problematical. They do, however, offer an interesting challenge to the threat from the Danish "mass-produced pig."

* H. R. Davidson. *Progress*, 1957, **46** (256), 85.

Spices and ulcers

A DIET-HEALTH relationship which has been discussed recently in America is the question of spices in meals for peptic ulcer sufferers. The bland diet that is necessary for the healing period is often too unpalatable for recovering patients to adhere strictly to it. Tests on 50 ulcer cases at the Harvard University Medical School have shown that some spices can be safely consumed; these are cinnamon, allspice, mace, sage, thyme, paprika, and caraway seed. Adding these to the diet brought no discomfort and the rate of ulcer site healing was not interfered with. Spices which had harmful effects, however, were black pepper, chili pepper, mustard, cloves, and nutmeg. The doctors concerned in this research went as far as suggesting that ulcer treatment would be improved by prescribing the "safe" spices in the diet, for the resultant improvement in palatability would bring more co-operation from the diet-weary.

Disproving a complaint

SOME evidence of the care taken to ensure that a baker accused of producing a loaf containing extraneous matter does not get rapped over the knuckles unfairly is given by Lancashire county analyst, Dr. G. H. Walker.

Commenting in his annual report on a sample of part of a brown loaf with needle and thread, he says this sample was submitted by a county sampling officer as the result of a complaint from a hospital that the needle, threaded with about five inches of fawn-coloured thread, had been found adjacent to, but not in the loaf, when it was being sliced.

The point at issue was whether the needle and thread had been in the loaf.

Both the needle and thread were clean and completely free from adhering particles of dough, furthermore the fawn colour of the mercerised cotton was not derived from the brown bread itself.

Needles and white cotton and mercerised cotton were placed in brown dough and baked. The needles remained bright and the thread remained perfectly white, but particles of dough were found to be attached firmly to the threads and even to the needles.

It was reported, therefore, that the colour of the fawn thread was certainly not derived from the brown bread submitted with it and that there was no evidence that the needle and thread had been embedded in the loaf prior to baking.

The complaint will strike most people as having been somewhat fatuous in the first place. Yet many manufacturers have been the victims of equally irresponsible claims, and there is some comfort to be gained from the knowledge that a public authority will go to such lengths to prove the facts.

Aberdeen seeks fish storage facilities

THE need for improved processing and marketing facilities, and more particularly for the creation of storage facilities at the major fishing ports, has been stressed in Scotland, where the meetings of the Committee of Inquiry are awaited with considerable interest. The position has been stressed in Aberdeen because of the growing difficulty there of getting an economic price for fish landings in periods of glut supply. Granton has also been very adversely affected and has recently presented a plea for some action. Aberdeen merchants have made one of the most realistic proposals so far in suggesting that there should be co-operative action by the merchant firms to provide quick freezing and storage facilities to freeze 20 tons per day and hold at least 1,000 tons.

The problem inherent in such a plan is that common to all such industries, that combined action is difficult to secure. The economic factors will probably force some such move, however, even if the various units are inclined to be jealous of their individuality. In any event, a scheme could be worked out which would maintain individual freedom while still providing the facilities needed.

The position can best be outlined by pointing to the 3,800 tons of good fish unsold in Aberdeen in 1955; in 1956, this figure was 2,750 tons. On top of this unsold volume, the fishing industry saw about half its catch last year go at uneconomic prices. Had the port had adequate freezing and storage facilities, all this fish could have been saved and held either for release in periods of scarcity, for manufacturing purposes, or for export.

The export factor is one which has particular importance. So far, only a limited amount of work has been done on export of prime Scottish fish. But the evidence is clear that foreign markets do exist and could be expanded. Some 15 of the 200 Aberdeen merchants export at present, and one firm in particular recently took fresh fish from Aberdeen overland to Milan, in Italy. The Aberdonians have their eyes on the European Free Trade Market, which is emerging, and see no reasons why prime North Sea fish should not go to Europe by road or air.

This calls for processing and holding facilities which are presently lacking and the obvious question is why this should be. The Scots point out that the White Fish Authority cannot lend money in Scotland on the same basis as in England since the Scottish law does not accept movables as security. In a project demanding expenditure of perhaps £100,000, the security must eventually be the contents, but under Scottish law this is not permissible. Net effect has been that Scotland gets a loan of 25% as against the 80% advances which are made in England. The Aberdeen fish firms are now campaigning for a comparable basis so that Scottish firms can have the same facilities as in England where quick freezing and processing have been pushed ahead strongly, sometimes by individual firms and sometimes by groups.

Animal health and food safety

THE relationship between animal and human health formed the subject of a recent World Health Organisation conference held in Warsaw. The conference was the first international meeting of WHO to be held in Poland, and was attended by medical and veterinary scientists from 23 countries in the European region of WHO.

During a discussion on food poisoning, it was pointed out that over 70% of the outbreaks of food poisoning occurring in Britain during 1956 were due to meat and about 10% to other foods of animal origin—eggs, milk and cheese. Processed and made-up meat products proved to be by far the most dangerous sources of food poisoning, accounting for 85% of the outbreaks due to meat. Some 9% of the meat outbreaks were due to canned meats and 1·6% to fresh meat.

Salmonella infection was reported to have been a cause of concern in Sweden since the war. A meat-borne infection in 1953 affected 9,000 bacteriologically confirmed cases, and in 1957 there were cases due to boneless veal imported from New Zealand.

Salmonella infection is also frequently spread by eggs, and it was reported that the Polish record in this respect is particularly good, since Poland is the only country from which Great Britain imports eggs in which this particular kind of infection has not so far been found.

The discussions on preventing food infection were concentrated on three points:

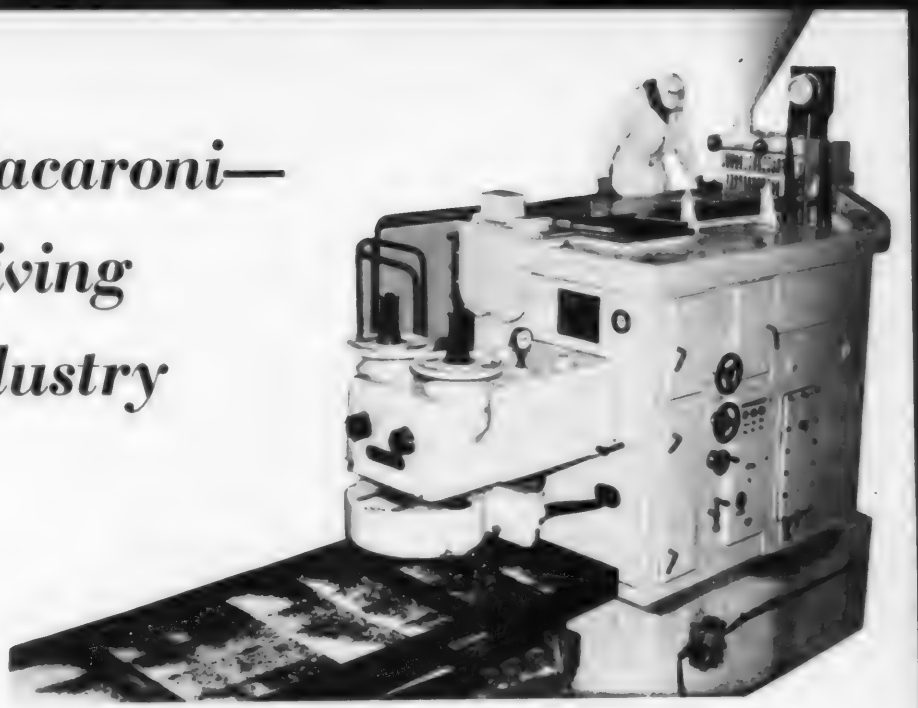
1. Prevention at the place of production. The eradication of tuberculosis from cattle, which has been achieved in Scandinavia and the Netherlands, and in which progress was reported from other countries, provides an example of this approach.

2. The adequate processing of foods to eliminate food poisoning organisms. An example is the pasteurisation of liquid eggs.

3. Better hygiene among food handlers. Infections of the nose and throat, dirty hands and neglected cuts among those who prepare, sell and serve food were held to be responsible for a good deal of disease.

Discussion also took place on the incidence of beef tapeworm in the Netherlands, where 4,000 to 5,000 patients are treated annually for the disease. The pasturing of cattle on land which is annually flooded with the sewage-polluted waters of the Rhine and the Maas was held to be partially responsible for the spread of the disease.

British Macaroni— A Thriving New Industry



The British macaroni industry has made rapid strides during post-war years, and controversy has naturally arisen about the relative merits of imported Italian paste products and their British-made counterparts. FOOD MANUFACTURE recently visited one of the most up-to-date of the British factories to report on the production of this type of product.

FOR many years the popularity of unleavened paste products—the *pates alimentaires* of France, and *paste alimentari* of Italy—has been increasing in this country. Stimulated, no doubt, by the increase in Continental travel on the part of British holiday-makers, and the spread of Continental-style restaurants throughout the country, the demand for such commodities as macaroni, spaghetti, vermicelli and noodles is now much greater in this country than it was in pre-war days. Before the war, there were only two firms in Britain making macaroni products, and not more than 1,000 tons per year were produced. This production has now risen to 300 tons per week—over 15 times the pre-war figure—and the British industry is continuing to expand. During the same period, imports of these products have risen from 1,000 tons to 3,000 tons per year, but this is to some extent off-set by the fact that not all the home-produced goods are consumed in this country—Britain is already building up a useful export trade.

In order to help the further expansion of the industry, an organisation of millers and manufacturers, known as the British Macaroni Industry, has now been formed. By suitable publicity campaigns designed to educate the British housewife in the many uses of macaroni products, and by stressing the high quality of the home-produced article, this organisation hopes to promote further increases in the sale of British goods.

Modern British factory

One of the most modern factories producing macaroni and spaghetti in this country is to be found at Slough, where Beatall Food Products, Ltd., make their *Sun Pat* brand products. Beatall's are now a subsidiary of H. S. Whiteside and Co., Ltd., who also make *Sun Pat* foods. The two firms amalgamated in 1950, Mr. H. S. Whiteside becoming chairman of Beatall's and Mr. T. A. Barnes its managing director. The firm moved from Chiswick in 1952 to take over its new premises at Slough.

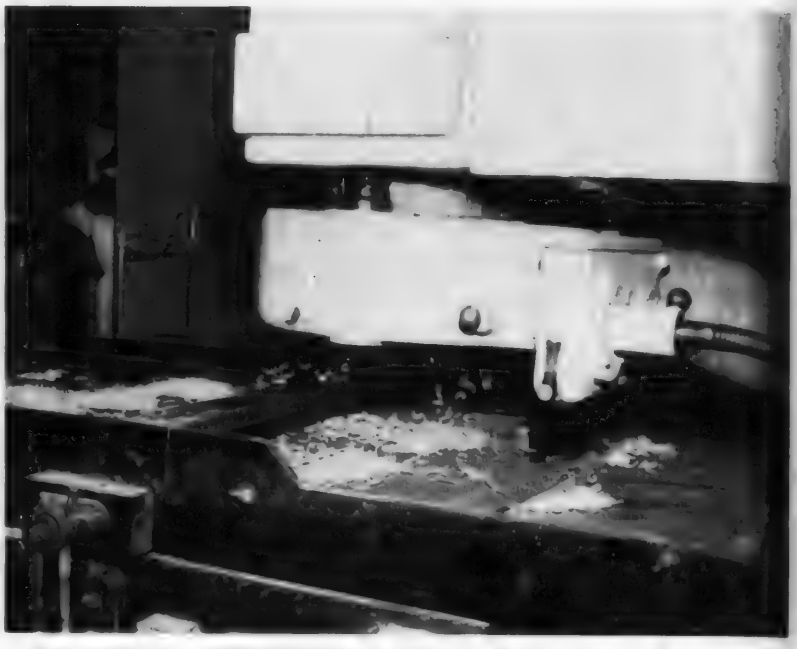
Above. **The Buhler mixer and vacuum press for macaroni products at the Slough factory of Beatall Food Products, Ltd.**

The actual operation of the factory is under the control of Mr. R. G. Blackwell, the production manager. Mr. Blackwell has made an extensive study of the problems connected with the production of spaghetti and macaroni, having been associated in his researches with Mr. A. P. O. Rogers until the tragic death of the latter in a racing accident at Goodwood two years ago. As Mr. Blackwell points out, much of the art of spaghetti manufacture lies in the drying operation, a procedure so complex that he prefers to use the term processing to the simple term drying. As a result of his work with Mr. Rogers, he has been able to assist in the design of special drying chambers, which have been constructed by Beatall's themselves, and which undoubtedly contribute in great measure to the high quality of their paste products.

In the course of this research

work, a comprehensive survey was first made of the atmospheric conditions such as temperature, relative humidity and wind velocity prevailing in the southern part of Italy, where macaroni products were originally dried in the open air. On the basis of these studies it was found possible to construct processing chambers in which the necessary conditions could be created artificially, and these chambers, designed and constructed entirely to Beatall's own specifications, now form the essential nucleus of the Slough factory.

As well as studying the atmospheric conditions necessary for the successful processing of the product, Beatall's were also able to study and re-create the conditions prevailing in a wide range of overseas climates, and to observe the behaviour of their products under them. As a result of this work, in which they were assisted by the Meteorological Office, who provided details of the prevalent atmospheric conditions in many parts of the world, they have been able to build up a substantial export trade, which now accounts for about one-third of their production. Macaroni products give off or absorb moisture according to the atmospheric conditions to which they are exposed, and by adjusting their processing conditions to suit the conditions prevalent in any country for which the products may be destined, the firm has found it possible to give a two-year quality guarantee for any area in the world.



A close up of the head of the Buhler press, showing short-cut macaroni emerging and falling on to the pre-drier.

Raw materials

Another important aspect of spaghetti and macaroni manufacture is, of course, the quality of the semolina from which it is prepared. Here the British manufacturers as a whole are particularly fortunate. The wheat used in the milling of semolina for the manufacture of paste products must have certain special characteristics, including extreme hardness, low starch content and high protein value. The wheat which best exhibits these characteristics—a type known as Durum—was first grown in Russia, and is now cultivated extensively in the Mediterranean and Balkan regions. It was introduced into Canada and the U.S.A. at around the turn of the century, but it was soon discovered that it could not be widely grown. Where the necessary semi-arid conditions for its successful cultivation do exist, however—namely, in the States of North and South Dakota, and in the Canadian provinces of Manitoba, Saskachewan, Alberta and Ontario—it grows to a perfection not found under European conditions, so that even the Italians themselves have now been forced to admit that the Canadian Amber Durum used by the British manufacturers is the finest which can be procured. As well as having the necessary characteristics already described, the Canadian wheat has a high yellow pigment content. This confers on the products the translucent yellow appearance which is reckoned as one of their attributes, and renders the addition of artificial colouring unnecessary.

In the milling of semolina, the bran and the softer parts of the endosperm, corresponding to about 50% extraction rate, are removed from the wheat. The screenings, which represent the hard inner particles of the endosperm, are then milled and graded into fine, medium and coarse grades of semolina.

Mixing and pressing

The first stage in the manufacture of macaroni and spaghetti is the mixing of the semolina with water in the correct proportions. This is followed by the pressing of the dough and its extrusion through perforated plates in the desired form. These operations are carried out in successive compartments of the same machine. The semolina is first emptied into the hopper of a vibrating screen, and is subsequently elevated to the press by a Redler conveyor.

In the mixing compartment of the press, the milled grain is mixed with water in a continuous operation by means of a proportioning unit, which allows the twin streams of water and semolina to be adjusted at will. About 35% of water is normally added, allowance being made for the moisture content of the semolina itself, which is determined by laboratory tests. A small amount of salt is added dissolved in the water, this being the only other ingredient. The semolina and water are well mixed

Short-cut macaroni being spread on drying trays after its passage over the pre-drier.

by means of revolving paddles, which at the same time convey the dough along the 5 ft. length of the mixing trough and discharge it at the far end. Here the dough passes through a small intermediary chamber into the screw press.

In the press used by Beatall's—a Buhler T.P.J. press of Swiss manufacture, with an output capacity of half a ton per hour—the pressing chamber is exposed to vacuum to de-aerate the dough (see FOOD MANUFACTURE, Vol. 32, p. 481, October, 1957). The use of vacuum in this way has made a big contribution to the improvement of quality in long paste products of the spaghetti type. It greatly increases the translucency of the products, and removes the troublesome fracturing which can arise from the presence of air-bubbles in the dough.

In the pressing chamber the dough is conveyed along by an extrusion worm, which kneads it into a homogeneous mass, build-up a pressure of about 1,500 lb. p.s.i. against the pressing head. The plasticised dough is then forced through a mould of the appropriate design, and retains its shape after extrusion.

For the manufacture of spaghetti, the extrusion plate has simple round perforations of the desired size. In the manufacture of macaroni, a somewhat more elaborate plate is used. Here the round perforations carry in their centre a solid pin, suspended from the back of the plate and fitted with centralising wings. The dough naturally has to separate as it passes the suspending arms, but as it passes between the pin and the edge of the hole it is reformed into a continuous cylinder and extruded with the hollow core typical of macaroni.

In the manufacture of quick-cooking macaroni, one of their major products, Beatall's use a plate containing 860 holes, each 3·5 mm. in diameter and carrying a pin of 1·5 mm. diameter. As the macaroni is extruded it is chopped off by a revolving knife, the speed of which can be adjusted to give pieces of the desired length, into short-cut macaroni, or elbows. Because of its short length and thin walls, this product can be cooked in as little as seven minutes.

Pre-drying

On leaving the press, the pieces of macaroni fall directly on to a pre-drier. This consists of a vibrating gauze conveyor, below which are fans and heating elements. By means of these a stream of warm air is blown over the product, and a rapid period of drying occurs. This is, in fact, the only stage at which rapid drying can be allowed. The product loses about 5% of water at this stage, and becomes somewhat firmer to handle. At the end of the pre-drier the macaroni pieces are spread on to trays, which are filled into racks for transportation to the drying chambers.

When long products such as spaghetti are produced, the extruded strands are guillotined to the required length and folded immediately over canes as they leave the pressing head, the canes later being suspended in the drying chambers where the final processing takes place.

Drying

It is in the drying of the product that the main art of spaghetti manufacture lies. As the drying chambers are being filled a draught of cold air is maintained which slightly case-hardens the products. When the chamber is full the doors are closed, and the temperature is increased; from this stage on the process has to be extremely carefully controlled. Although loss of moisture must naturally occur from the surface of the product, the process was graphically described by Mr. Blackwell as being one of "drying from the inside." In effect, this means that the conditions of drying must be such as to allow the constant equilibration of moisure content throughout the thickness of the product. This results in even drying, and no core of moist material is left at the centre to cause rupture of the product as it subsequently attempts to dry out.

In practice, this highly specialised drying is carried out by applying heat and at the same time maintaining a very high humidity. The drying chambers are automatically controlled by a panel of instruments, which are actuated by changes in temperature and humidity within the chambers.

Capillaries run from a wet and a dry bulb to two expansion plates, which operate a baffle plate. This cuts off or allows access of compressed air to two diaphragms, which control the application of wet or dry heat. Temperature is controlled to $\pm 1^{\circ}$F.

The drying period varies somewhat with the product, as the rooms are designed for use with either long or short goods. It varies also with the degree of dryness required, which alters with the eventual destination of the product.

Paste products must by law be dried to not more than 14% moisture, and with long spaghetti about 24 hr. is necessary to achieve this degree of dryness. Products such as short-cut macaroni can be dried more rapidly, 14 hr. usually being sufficient to produce the desired moisture content. Since each chamber will hold about $1\frac{1}{2}$ tons of short-cut macaroni, as opposed to about 1 ton of long spaghetti, a considerably higher output can be maintained on the former product, and the 6 drying chambers which make up the battery at Beatall's factory regularly turn out 40 to 50 tons of short-cut macaroni per week.

After this drying process the products exhibit a very considerable degree of mechanical strength. The short-cut macaroni pieces are firm and not easily crushed, whilst the strands of long spaghetti have a marked resilience, and can be bent for some way before they eventually break. When the products do fracture, the broken surfaces have a translucent, glassy appearance, which is one of the standards by which products of this type are judged. It is here that the skill and knowledge exercised in the drying process are shown. In badly processed material, this mechanical strength is defective, and losses from broken and crumbling material may be heavy. Moreover, as was mentioned earlier, paste products of this kind have the capacity to take up or lose moisture according to the temperature and relative humidity to which they are exposed. The taking up of moisture naturally leads to expansion of the product, whilst the loss of moisture leads to contraction. This exposes the product to severe mechanical strains, and it is in its ability to resist these strains without fracturing and disintegrating that much of the quality of the product lies. Similarly, it is by anticipating these changes, and adjusting the moisture content of their products accordingly, that Beatall's have been able to give such an extensive guarantee to their overseas customers. For example, they have found, as a result of earlier research work, that when spaghetti is destined for the highly humid areas of West Africa, it may be necessary to dry it down to a moisture content as low as 6%, in order to allow for the very high moisture uptake which will ensue when the product reaches its destination.

Racks of long spaghetti ready for drying in the processing rooms.

Packaging

A certain amount can also be done to protect the products from the vagaries of extreme climates by the use of protective packaging materials, and this is done whenever possible. Thus, again for the West African trade, use is made of waxed bags, coated with moisture-proof film, for packaging the products.

In the normal way, long spaghetti is hand wrapped, but machines are now being designed to perform this operation, as over 5 tons per week are packed for the retail trade. The short-cut macaroni is already packed mechanically. It passes first over a spirally fed sorting belt, where any visible impurities are removed, and then over a magnet for the removal of any metallic particles. From here it falls to a second spiral conveyor, which feeds a battery of four weighing machines, each capable of 12 operations per min. The weighed macaroni is fed directly into packets, which then move along a conveyor to a sealing machine, where they are folded and sealed. The sealed packets pass through a metal detector working on an X-ray principle, which is able to give warning of any metallic impurities such as brass, etc., which would not be affected by the magnetic screen occurring earlier in the line. Finally, the packets are check-weighed.

Laboratory control

The firm has two laboratories at its disposal, one at the factory at Slough and one in Camberwell, in which the quality of the products and the raw materials from which they are made are kept under sur-

veillance. As was mentioned earlier, it may be necessary to adjust the water added in the mixing process according to the moisture content of the semolina used, and this has therefore to be determined on each delivery. In addition, the granularity of the semolina is highly important, and this property is also the subject of laboratory tests. In a mixture consisting of granules of various sizes, the smaller particles tend to soak up the water at the expense of the larger ones. When too great a range of particle size occurs in the semolina, therefore, the uptake of water is uneven, and the smoothness and mechanical strength of the product are impaired. Sieve tests are therefore performed to ensure that the particle sizes of the milled grain fall within predetermined limits.

Another property of the raw material which must be checked is its gluten strength. This plays an important part in conferring the desired degree of elasticity on the product at all stages in its manufacture, and in ensuring the correct cooking characteristics in the finished article. This latter property is particularly important, as it represents the final test of the quality of the product. When finally cooked, macaroni products should be capable of swelling to at least twice and sometimes three times their size in the dried state, and this swelling should not be accompanied by any tendency of the product to become pasty or to disintegrate. This property is conferred on the products largely by the special nature of the Durum wheat, and is a result of the high gluten and relatively low starch content of this grain. High-grade Durum semolina should contain 11·5% protein against the usual 10 to 10·5% present in wheat flour.

Conclusion

It is probable that for some time to come macaroni and spaghetti will retain their essentially Italian associations. None the less, with a growing home demand and an export trade which is rapidly reaching out to different parts of the world, the British industry is already producing 600 miles of spaghetti every hour, and seems well set for a further rapid expansion.

SUPPLIERS OF EQUIPMENT

Instrument control: *Short and Mason, London.*

Laboratory equipment, moisture meters: *Thos. Robinson, Rochdale.*

Sieves: *Hy. Simon, Stockport.*

Buhler press: *Buhler Bros., Barnet.*

Conveyors: *Redler Conveyors, Stroud.*

A view of the sorting conveyor and magnetic metal monitor for short-cut macaroni.

Flavour Fundamentals

"If the flavour of a food is so poor that it is not eaten by the soldier . . . the food is wasted," said the scientific director of the U.S. Quartermaster Food and Container Institute in his introductory address to a symposium on the chemistry of natural food flavours. Substitute the word "consumer" for "soldier" and this remark sums up the need for flavour research.

The Q.M. Container Institute, has recently published the papers read at this symposium as a booklet* for distribution to research organisations, etc., with an interest in the problems of the chemistry of food flavours. Between the introductions and the summing up, the papers deal broadly with techniques and methods for research in flavours; fruit and vegetable flavours and the flavouring of processed foods.

Each paper given in the symposium was, in effect, a summary of an important field of present-day flavour research. Thus papers on the techniques and methods for research in flavours covered the mechanism of taste and odour perception, quantitative and qualitative measurement of flavour and the uses of gas chromatography and mass spectrometry in the study of flavour. Fruit and vegetable flavours studied included those of cabbage, citrus fruits, deciduous fruits and strawberry with a paper on flavour propagation through enzymatic action. Cheese, bread, beef, chicken and coffee flavours were considered.

As one of the speakers remarked, apparently the chemical approach to flavours is so complicated and involves such difficult techniques and so much time that it has frightened away even very good chemists. However, more and more interest is being taken in fundamental studies of the substances responsible for the flavours of foods and one hopes that they will be further stimulated by the proceedings of this symposium.

* *Chemistry of Natural Food Flavours.* Q.M. Food and Container Institute for the Armed Forces, Washington, D.C. 1957. Pp. 200.

Pickles and Sauces

By J. R. Burrell

Vinegar chemistry and manufacture ★ Gum tragacanth and other thickeners ★ Sugar esters ★ Pickled herrings ★ Sorbic acid ★ Pasteurisation of cucumber pickles ★ Benzoic acid identification

THERE have been no new trends in public taste in pickles and the general demand still favours the sweeter and blander kinds of condiments.

Comminuted pickle in a sweet sauce still has the ascendency among the pickles, and the sweet sauces with acidity range 2·5%-3·5% and sugar range of 20%-40% are still the best sellers among the sauces.

Tomato ketchup is very popular indeed, and sales of the better class brands increase steadily, whilst even the second-class products in which puree of indifferent colour and flavour are used, as a rule, more than maintain their position.

Pickled onions and piccalilli are still in demand as is the more seasonal pickled red cabbage.

Among the more "specialist" packs, horseradish sauces and creams sell steadily. Concentrated mint sauces are used in more homes every day and salad creams and mayonnaise show no tendency to decline. All in all, it appears that a rising standard of living, with the concommitant increase in the public use of savoury proteinacious foods, favours the pickles and sauces industry.

The trend in favour of the products of specialised manufacturers appears to be growing, perhaps to the detriment of the all-round food manufacturer. Certain newcomers to the food industry who had previously specialised in highly profitable non-food products, easy to prepare and pack mechanically, jettisoned many of the preserved foods upon realising the smallness of the profit margin. This move, of course, has helped the rest of the industry.

Vinegar manufacture

The use of the submerged culture acetator is obviously growing, and since Mr. Mollenhauer's article, which was the subject of some remarks in last year's review, there has been more mention of this rapid and effectively controlled type of acetation. An anonymous writer in *Food Packer*[1] claims that the method is 27 times more efficient than the old wood shavings generators and that the theoretical efficiency of conversion of ethyl-alcohol to acetic acid is in the region of 98%.

One third of the vinegar produced in each day and night of conversion is retained in the acetator for inoculation of the new charge of alcoholic wort or diluted ethyl-alcohol itself.

British vinegar manufacture

Among recent patents is one taken out by British Vinegars, Ltd.,[2] which claims improvements in the manufacture of vinegar, the benefit of which will be felt by the pickles and sauces industry. The process concerns preparation and use of a micro-organism, *Acetobacter-operans*, for the manufacture of acetic acid from alcohol in a medium containing up to 7% ethyl alcohol at a minimum rate of 20 kg. per cu. metre of beechwood shavings per 24 hr. at 30°C. and to achieve a final acidity not less than 9% acetic acid, if sufficient alcohol is provided, in the manufacture of vinegar.

Wine vinegar

It has been suggested that there should be a place for wine vinegar both for manufacture and for use on the table as a condiment. In the U.S. this has been taken care of by a Californian organisation who are producing a wine vinegar and are publicising the project as a means of enlarging the market. The influence of bouquet as an adjunct to taste and appearance is, of course, obvious, and it may be that a market could also be created in this country.[3]

Brewed and non-brewed vinegars

At least two new methods have been suggested for differentiating between malt and non-brewed vinegars. In one a pink colour is produced when two drops of saturated alcoholic hexylresorcinol and 2·5 ml. of a saturated aqueous solution of trichloracetic acid are added to 2·5 ml. of "natural" vinegar. Acetic acid produced by non-brewing processes does not give this reaction, claim the authors of the method, Rosenthaler and Vegezzi.[4] In the other method a Geiger counter is apparently used. For according to an article in *Atomics*, vinegar produced by acetic fermentation of natural organic substances is slightly radio-active from the presence of radioactive carbon, whilst "non-brewed" vinegar pre-

pared from calcium carbide with acetylene as intermediate, is not.[5]

Vinegar acidity

R. Sigmund,[6] in a discussion concerning the titratable acidity and *p*H of vinegar and non-fermentation vinegars (diluted commercially-produced acetic acid), states that the reason for the low *p*H of the latter is the presence of formic and propionic acids which dissociate to a greater degree.

Thickeners

Gum tragacanth remains the chief thickening and mechanical stabilising agent. There are probably other materials with equal possibilities and similar resistance to breakdown with the combined factors of heat and acidity, but it takes time to cover every aspect of the behaviour of thickeners under varying conditions and the industry in the past has sustained many losses following incautious use of more than usually unstable thickening agents which appeared to be very promising at the time of use in that they yielded clear, non-granular, viscous solutions. Later on it was found that some products prepared with these became uniformly thin, others acted as finings bringing down all the dispersed elements, leaving a deep clear zone in each bottle, and yet others showed syneresis—product of a shrinking gel.

Knowledgeable handling of thickeners may make the best of those that are generally regarded as unsatisfactory through susceptibility to hydrolysis due to heat and acidity, but even so there are many factors to be considered and it is best for manufacturers to use an all-round stabiliser that may be used without difficulty to cover ever possible condition that may affect stability.

Heat and acidity factors. Gum tragacanth, like most of the stabilisers which are suitable for food products, is only relatively stable and is affected adversely by heat and acidity so that this fact has to be taken into consideration in manufacture. Great economies may be made in the use of this gum by arranging for the stabiliser to have the minimum possible heating after the batches have been acidified. This is generally arranged either by adding acidifying materials at the end of the cooking period or by putting in the gum as the last ingredient.

However, these measures by themselves will not necessarily make for all possible saving in the use of gum, because even when the thickener is added at the end of a cooking process it is still subjected to the effects of comparatively high acidity at an elevated temperature during cooling. In large batches, this can be a protracted process, taking anything from a few days to a fortnight, unless some kind of heat exchange system is used to bring down the temperature.

In the latter case a great saving may be made in the amount of gum used, for obviously, if slow natural cooling results in the destruction of, for example, 75% of the viscosity in certain cases, rapid cooling by heat exchange will enable the manufacturer to use only one quarter of the amount of thickener to achieve the same viscosity. That this is feasible may be proved by sinking hermetically-sealed bottles of acidified gum solution into the centre of a vat set aside to cool, taking viscosities before and after cooling. As these test samples are in the centre of the batches of product destruction will be at maximum, whereas in the actual condiment in the vat it will vary according to the contingencies of cooling and will be at minimum on the surface and at the sides due to air cooling; but the mean viscosity due to gum will be very much less than before the cooling period. One factor which makes for slow cooling in a batch of condiment is actually the presence of gum which, in the function of stabiliser, retards movement that would otherwise be produced by cooling of the surface and sides so that lowering of temperature is practically by conduction only.

Using gum to the best advantage. This is arranged by, 1. Putting gum into the condiment at the end of the boiling period. 2. Rapid cooling. 3. Making up the condiment in two parts (*a*) The ingredients minus the gum with some of the sugar and some of the water (*b*) Gum, sugar and the smallest amount of liquid possible to produce a smooth mucilage. In the last method the gum and sugar solution is prepared first by dry mixing the gum and sugar, pouring this into boiling water with rapid mechanical mixing and leaving in a large shallow vessel to cool. The gum solution should be as concentrated as possible but not so viscous as to render mixing difficult with the rest of the batch later on. The idea behind this system of working is to use the cooled gum-syrup to bring down the temperature of the batch to below the range in which gum destruction is most rapid. It goes without saying, however, that the most efficient method of preparing sauces, condiment bases, sweet pickle liquors, salad cream and mayonnaise water phases, etc., in which tragacanth and vinegar are used, is to add the former in powder form, dispersed by admixture with soluble ingredients, such as salt or sugar, at the end of the cooking period; to whisk rapidly and efficiently by mechanical means and then cool immediately by heat exchanger. When changing over to this scheme of things from another in which natural cooling of large batches has been carried out, it must be remembered that there will be less darkening due to caramelisation in the quickly cooled materials, so that in order to match the tint of the product prepared by the older method, caramel would have to be added to the heat-exchanger-cooled material.

Evaluation of gum strength

Since different parcels of gum tragacanth vary in viscosity when made up into aqueous solution or when dissolved in vinegar, it is obvious that the strength factor must be taken into account when purchasing. Apart from other considerations, it is also necessary to use similar "strength" gum in manufacturing a product to prevent variation of viscosity leading to the possibility of separation. One method of achieving uniformity of gum strength is

to buy gum of guaranteed stable viscosity characteristics. Uniformity is achieved by powdering various "parcels" of flake gum and mixing them in the proportions necessary to bring it to a standard. The powdered product is usually marketed under a trade name. Other means of achieving standard viscosity is to either reject all samples of gum other than those which, when made up into solution, achieve viscosities in the range desired or by testing each sample tendered and keeping those which make up into relatively high viscosity solutions and thereafter to use the amount necessary to produce required viscosity in the finished product.

When purchasing gum it is plainly advisable that the "strength" should be known so that this and the price factor may be reasonably equated. When evaluating gum strength, it should be remembered that the conditions must be the same on every occasion that a test is made if the results are to have any value.

The following method is reasonably rapid. First a quantity of the material to be tested (after correct sampling) is ground to a certain mesh size in a mill. Half an ounce of the powdered material is well mixed with 2 oz. of granulated sugar in order to make for rapid dispersal and the mixture dumped into one pint of a boiling 2½% acetic acid solution which is then rapidly stirred without further heating. The solution is then stirred occasionally to counteract the settling out that occurs and is left overnight to swell to the maximum extent. After a further rapid mixing next morning the gum is put through a small laboratory homegeniser and after a further mixing and 3 hr. settling period, is cooled to 60°F. or other convenient temperature and tested by a Ferranti or other viscometer.

When time considerations make for urgency, the homogenising process may be omitted and the solution tested by viscometer immediately after stirring and cooling in the morning following the soaking procedure. The method may be speeded up tremendously, for if the gum is powered finely enough before being put with the dispersal medium into the boiling dilute acetic acid, it may be tested immediately on cooling provided it is efficiently stirred. The procedure outlined aims at attaining maximum swelling and really adequate mixing prior to testing, but if, for example, the homogenising stage is not carried out, the viscosity will be only slightly less. The main thing to realise is that exactly similar conditions must obtain each time of testing.

Guar gum. This has become available in this country and its use would appear to be satisfactory in cases where rapid cooling is carried out. The mucilage has maximum body, very clean appearance and is prepared in solution like tragacanth. Initial tests with suspensions of keiselguhr show that the rate of breakdown due to acid and heat is somewhat greater than with tragacanth. After some hours heating at temperatures between 160°F. and 212°F. the dispersed material forms a more tightly packed zone with guar than with tragacanth.

Amylopectin starch

This has much wider application than can be dealt with in this article and improvements, some of them revolutionary in scope, may be made in all manner of products in which flours or starches had been used previously. It is available for manufacturers, and from preliminary tests it appears to have great potentialities, especially in cases where a high sugar concentration appears to prevent effective gelatinisation in the case of unmodified starch. To take an example: a 2½% watery solution of a sample of corn starch, when tested alongside a similar concentration of amylopectin starch, gave a similar order of viscosity, but when both were prepared in similar concentration in sugar solutions between 50% and 55%, the unmodified starch solution had a viscosity of only 4 poises against the 24 poises of the amylopectin solution (in 2½% acetic acid).

Where sugar concentrations are much in excess of 55%, the water present does not appear to be available for gelatinisation of the starch, which remains relatively unswollen, giving suspensions rough to the palate. Different starches vary in ability to become gelatinised in syrupy solutions but of course it is always advisable to arrange optimum conditions for gelatinisation in actual manufacture and to add sugar at later stages in the process. When using amylopectin starch in sugar solutions of the range mentioned, actual boiling was found to be necessary to produce maximum thickening, and since some operatives are inclined to regard movement at the surface edge of jacketted pans as a sign that the contents are at boiling point, it is advisable to make sure that actual boiling of the mass has been achieved in all cases.

Identification of thickening materials

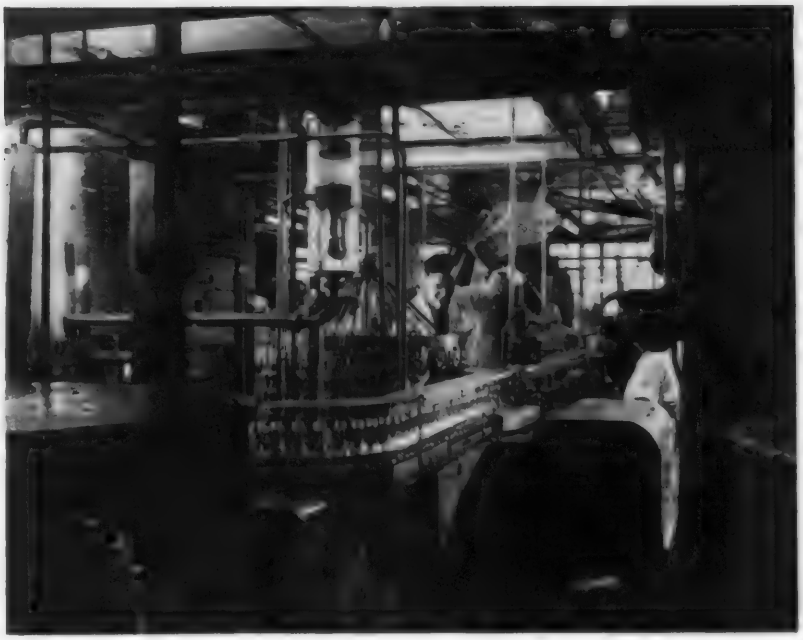
Hydrolysis with acid and identification of the resultant sugars by use of paper chromatography has been carried out by Becker and Eder in Germany, who have provided chromatographs for agar, gum tragacanths, locust bean gum, gum arabic, pectin, etc.[7]

Sugar esters

These non-ionic surface active agents may become available some time in the near future. Pilot scale plant has already been set up in the U.S. and samples will become available for wide testing. These esters are non-toxic, tasteless, odourless, and are said to be probably the only water-soluble surface-active agents completely safe for human consumption. On ingestion, they break down to sugar and fatty acids. From the data given by L. Osipow and F. D. Snell, it appears that the esters may have a very wide application indeed.[8]

Pickled herring packs

Roll-mops and Bismark herrings appear to be gaining some ground and it might be of interest to indicate the general principles of manufacture and to suggest modifications of packs likely to prove per-



Tomato ketchup continues to enjoy great popularity with the public, and sales of all the better quality brands are still increasing. Rapid production techniques are necessary to meet these heavy sales. Here an Albro 24-head filler is shown filling ketchup at the rate of 120 bottles per minute.

haps more popular than the usual marinated products.

Marinated fish are generally prepared by trimming along the bellies after heading and gutting to remove fins and the fine bones in that region. The herring are then prepared as for bismarking or roll-mopping and put into a bath of weak acetic acid and brine —7% of acetic and 5% salt being suitable. After 18-24 hr. they are removed and put into jars with vinegar, salt and the usual spices, *i.e.* peppercorns, ginger, mustard seed, bay leaves, cloves, coreander seeds, small onions and sometimes cucumber. The salt content of the liquor should be about 3% and the acidity 3½%. If the salt of the second and final pickling liquid is omitted or is too low, the fish will soften and disintegrate in a few hours due to osmotic effects. A very attractive pack may be prepared by immersing small cutlets of marinated herring in a mayonnaise, which also must have similar salt and acidity on the volatile fraction as that of the fish.

Sorbic acid

During the past year there have been more references to the preservative action of sorbic acid as a fungistatic agent and a selective growth inhibiter for undesirable yeasts and moulds. In a Czech paper, Ledabyl[9] states that paraffin wax and polyvinyl wrapper treated with sorbic acid inhibited the growth of moulds on the surface of Dutch type cheese during two months' ripening. The inhibiting effect was more effective with sorbic than with benzoic acid used in similar concentration. In a Canadian reference by D. W. Emmerson,[10] the inhibiting effect is reviewed and the fact brought out that desirable micro-organisms can still function effectively in curing. Its non-toxicity and its use under the Canadian Food and Drugs Regulations is defined. Its effectiveness is greatest at low *p*H (4·5 or less), but even above this it is claimed to be more effective than sodium-benzoate or the propionates. Sorbic acid is widely used both in Canada and the U.S. in a wide range of products and as a dip for fresh fruits such as apples and peaches.

Pasteurisation of weakly acid cucumber pickles

Work carried out in the U.S. by Cook, Pflug and Rees[11] showed that a holding time between processing fresh cucumbers into fresh, whole, dill pickles, adversely affected the quality. The quality points were skin colour, texture, discoloration of spine spots, shrinking at stem and flavour. A chart included in the article enables manufacturers to predict pickle quality according to permissible holding times at various temperatures.

Esselen and Anderson[12] reviewed the literature covering pasteurisation of fresh pack pickles: and heat penetration data for various types of pickles in different size packs is given. These North American packs are, as a general rule, less acid than the British packs, but even so, such data as are provided can often prove very useful as a starting point for work that can really be of great use in this country. Among the points presented in the literature reviewed by Esselen and Anderson, was the fact that the degree of acidity of the packing liquor did not affect the firmness of pasteurised pickles after storing. Also it had been found that heating pickles at 180°F. for 40 min. did not affect the firmness of cucumbers after storage. Pasteurisation for 30 min. at 180°F. bath temperature was found to prevent spoilage and development of off-flavours due to peroxidase in quart jars of pickled cucumbers. Pasteurisation procedures for comparatively weakly acid pickles of the U.S. type are obviously more effective for our

(*Please turn to page 17*)

Confectionery

By D. R. Felstead*, F.R.I.C.

Raw materials ★ Sales ★ Antioxidants ★
Colours ★ Research ★ International meetings

IN spite of the increasing consumer demand in this country, the total tonnage of chocolate and sugar confectionery distributed during the first eight months of 1957 dropped to a lower level than during any comparable period since confectionery was derationed. Compared with the same period last year there has been a reduction in consumption of $\frac{1}{3}$ oz. per head per week to approximately $7\frac{3}{4}$ oz.

Raw materials

The more stable position of prices during 1956 reported in the Annual Review last year has not persisted in 1957.

The concern at the increase of 4s. 4d. per cwt. in the price of granulated sugar gave way to dismay at the very unstable position that was to follow the introduction of the new arrangements for the marketing of sugar in this country on January 1st of this year. The initial basic ex-refinery price on that day was 73s. 7½d. per cwt., which represented an increase of 3s. 1½d. per cwt. on the price ruling in December, 1956.

The new price was not the result of the new scheme itself, but mainly of the following three factors:

(*a*) the free world market price.
(*b*) the negotiated price under the Commonwealth Sugar Agreement.
(*c*) ocean freight charges.

Thus the new price was a true reflection of the current world price of sugar, to which was added the first surcharge of 1s. 2d. per cwt. (which was imposed by the new Sugar Act), the refiners margin, and the duty.

The surcharge is an arrangement whereby the cost of the Commonwealth and home-produced beet sugar is accounted for while permitting trade in sugar to revert to a world price basis.

Among the anticipated virtues of the new scheme was the fact that it again became possible for manufacturers to cover their requirements by forward purchases, and enabled them, if they so wished, to import raw or refined sugar from any source for both home trade and export manufactures.

Unfortunately, within two weeks of the introduction of the scheme the price of granulated sugar had risen to 86s. per cwt., and by early February had dropped back to 76s. 3d. Manufacturers, and particularly small manufacturers or those with seasonal trade, were presented with serious problems by the high and fluctuating price.

As the Sugar Board was set up to buy Commonwealth sugar at negotiated prices, and to resell it at world prices, in the early stages of the new arrangements it was making considerable profit from its transactions because of the high world prices. The Act provided for the payment of "distribution payments" on all sugar consumed in this country, so reducing the home trade price to below the world price and thus enabling the Board to offset its profit.

The price remained high until the middle of the year, generally remaining between 80s. and 84s. per cwt., and criticism of the failure to introduce a distribution payment mounted. As early as February 12 the situation was debated in the House of Commons, when Mr. Frederick Wiley, the last Parliamentary Secretary of the Ministry of Food in the Labour Government, moved a Prayer for the annulment of the Order imposing the present surcharge. In reply it was pointed out that the surcharge only represented about one-eighth of a penny per lb. In March, a Conservative Member unsuccessfully requested an amendment of the Act to enable the Sugar Board to restrict fluctuations in its selling price to only one-tenth of each fluctuation in the world price. The confectionery industry, together with the other interested industries, made representations to the Sugar Board again in May, explaining the seriousness of the situation; but it was not until the middle of July that the Minister of Agriculture, Fisheries and Food, on the advice of the Sugar Board, suspended the surcharge and introduced a distribution payment of 4s. 8d. per cwt., thus immediately reducing the price of granulated sugar from 75s. 9d. to 69s. 10½d. per cwt. In addition, the world price of sugar continued the fall which had started in early July until the price on August 8 was 55s. 1½d., the lowest price to manufacturers since March, 1947. Since August the price has remained low, at one time dropping to 49s. 4½d. per cwt.

* Chief Chemist and Technologist, Barratt and Co., Ltd.

Cocoa prices

The unstable position has not been limited to sugar prices. The sustained lower cocoa bean prices reported in the last Annual Review have not been maintained. Early in the year there were indications that there might be overproduction of cocoa, and in March the price had dropped to £170 per ton. Later in the year Brazil decided to place a minimum price of £250 per ton on the sales of Brazilian cocoa. Prices began to rise, but it was anticipated that they would begin to fall as the West African crop came in again in September. The fall did not materialise, however, as the West African production had been disappointing, owing to bad weather conditions in that part of the world, which delayed and reduced the crop. For example, in Ghana the despatches of cocoa beans for the first nine weeks of the season amounted to 107,000 tons, whereas during the first nine weeks of the 1956 season 141,000 tons had been despatched, and on the same date last year, namely December 1, 158,000 tons had been despatched. By December 1 beans had risen to £337 per ton.

Sales

The confectionery trade was perturbed that the Shops Bill, which was introduced into the House of Lords in November, 1956, would bring forward the general closing hours for the sale of confectionery from 9.30 p.m. to 7 p.m. on "normal" weekdays and from 10 p.m. to 8 p.m. on "late" days, thus curtailing the hours available for the sale of confectionery by 17 hours per week; these 17 hours, furthermore, being the peak trading hours. During the second reading of the Bill in the House of Lords early in 1957, Lord Mackintosh of Halifax expressed these misgivings in presenting the views of all sections of the confectionery trade. Speaking of the importance of the industry to the country, he pointed out that it employs 300,000 people in all its branches, employs £100 million of capital, has total retail sales of over £250 m. per year, and represents an export trade of £20 m. per year. Continuing, he said, ". . . people buy chocolates and sweets largely on the impulse of the moment. That is why the turnover of the confectionery trade is largely closely bound up with the hours at which the goods are on sale. If you are unable to buy that bar of chocolate or bag of sweets in the evening, because the shop is closed, you do not buy two to-morrow; that sale is definitely lost, but if you need a pair of shoes and cannot get them to-day you will most certainly buy them to-morrow. The sale of confectionery, ice cream and tobacco is closely bound up with the public's hours of leisure and entertainment. That is why the evening hours, which the Bill proposes to cut off, are so important, both to the public and the industry. . . . The effect of cutting off sales of sweets in the evening hours would be even more serious to the retailer. We have had a recent survey, and find that nearly two-thirds of the sweet shops in the country now keep open during the evenings." Lord Hailsham, in replying for the Government, gave an undertaking that it was their intention to make an exception of the confectionery and tobacco trades. In July, however, the Government announced its intention not to proceed with the Bill in the present session.

Antioxidants

In December, 1956, the Minister of Agriculture, Fisheries and Food announced that he had decided to accept, with minor changes, the revised recommendations of the Food Standards Committee Report of August 31, 1954, and that he proposed to permit the use of antioxidants in certain foods only, namely oils and fats, essential oils, and butter used for manufacture. The four antioxidants named in that report, *i.e.* propyl gallate, octyl gallate, dodecyl gallate and butylated hydroxy-anisole, are to be permitted, and in addition butylated hydroxy toluene, which has been developed in the meantime, is also to be permitted. The proposed regulations also specify the limits for the amounts of these substances which may be added. The date of operation of the new regulations has not yet been announced, and it is not clear what the legal position regarding their use in foods for sale in Gt. Britain is in the meantime.

Food colours

The Government's intention to introduce legislation governing the use of colouring matters in foodstuffs was confined by the publication of Regulations on June 28, 1957, which included a permitted list of colours. As a result of these regulations, colour manufacturers are prohibited from supplying for use in food in the United Kingdom any colours other than those on the permitted list. Food manufacturers, wholesalers and retailers are prohibited from selling articles of food containing any colour other than those listed after expiry periods of 6, 12 and 24 months. The confectionery industry, more than any other, is affected by these regulations, and has been presented with the problem of making changes in the colours that it uses yet retaining the "eye-appeal" of its products. Between the time of the publication of the Food Standards Committee's Supplementary Report on Colouring Matters, which was reported in the last Annual Review, and the publication of the regulations in June, the Preservatives Sub-Committee reviewed additional evidence which had become available of the biological properties of certain colours. This resulted in the down-grading to "Class C" of four colours which had appeared on the proposed permitted list and their removal from the final permitted list. It should be explained that Class C implies colours which have been shown to have or are suspected of having harmful effects on health. The four colours removed were Rhodamine B., Rhodamine 6G., Violet BN. and Violet 6B. At the same time two colours, Fast Red E. and Violet BNP. were added to the permitted list. The removal of Violet 6B., which is included in the United States list of certified colours, will present additional difficulties to exporters of confectionery to the dollar

markets, as does the fact that the new British List does not include a satisfactory blue colour which is acceptable to the United States and Canadian authorities. It is to be hoped that evidence of the harmlessness of Brilliant Blue will be forthcoming which will enable this colour to be added to the British list, thus removing this difficulty.

Research

In June the British Food Manufacturing Industries Research Association published its annual report for 1956, in which the Chairman, Mr. R. S. Woolland, referred to two projects with which the Research Association had been concerned during the past two years, namely the Association's Liaison and Advistory Unit and the proposed Biological Testing Station for food additives. This Liaison and Advisory Unit, which is now in its second year of operation, has proved of great value. Its service is open to both members and non-members of the Research Association, and can be of particular help to companies manufacturing on a small scale without a research organisation or laboratory facilities of their own, and an inducement in the form of free assistance in the first instance is offered.

Research projects on hand at the Association include:

Cocoa and chocolate

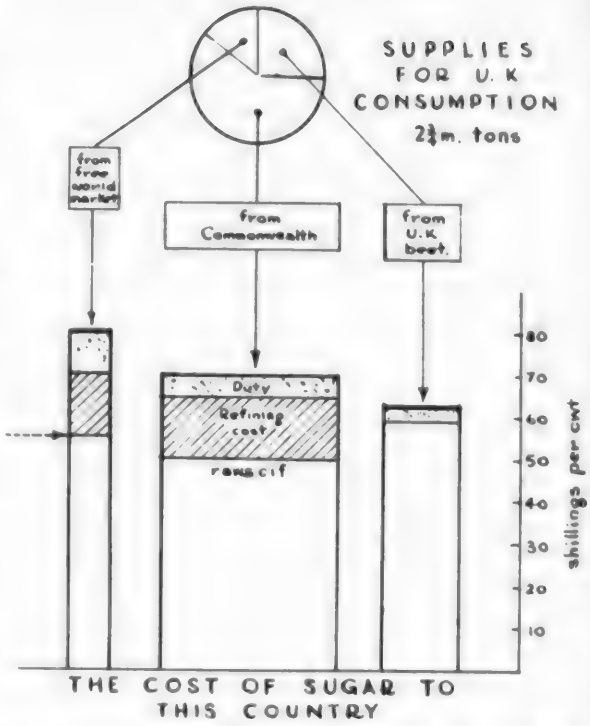
(1) The rheological properties of chocolate, including the measurement of viscosity.
(2) The stability of cocoa butter and its constituent glycerides.
(3) The determination of the particle size of sugar in chocolate.
(4) The detection in cocoa butter and chocolate of adulterant fats.
(5) Analytical methods for chocolate.

Sugar confectionery

(1) Methods for the determination of the moisture content of high boiled confectionery products.
(2) The keeping properties of boiled sweets and toffees in relation to their composition.
(3) The drying of confectionery products.
(4) The deterioration of flavour in citrus essential oils.
(5) The foaming properties of liquid glucose.
(6) Analytical methods for confectionery including the determination of fat.
(7) Dried egg albumen, including the investigation of the problem of sterilisation by heat treatment and the effect of such treatment on foaming properties.

General

(1) Factory tests for trace elements.
(2) Examination of foodstuffs for contamination by extraneous matter.
(3) The irradiation of foods, including the treatment of imported frozen egg.
(4) Paints for use in food manufacturing factories.



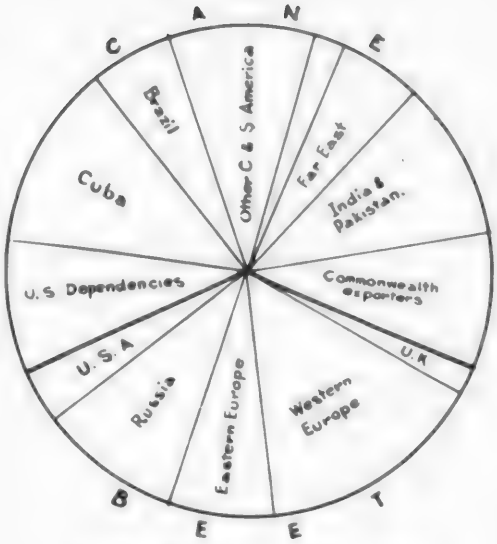
The diagrams above and on the opposite page, which are reproduced by permission of the Cocoa, Chocolate and Confectionery Alliance, illustrate graphically the world sugar production position at the beginning of 1957.

The International Sugar Confectionery Manufacturers' Association

During October the Technical Committee of the International Sugar Confectionery Manufacturers' Association met again under the chairmanship of Mr. C. Hinton, of the British Food Manufacturing Industries Research Association, and on this occasion they were the guests of the two German Associations, the Verband Deutscher Schokoladefabrikanten and the Verband der Deutschen Susswarenindustrie, at Wiesbaden, the meetings being conducted in the famous Kurhaus.

The Committee's principal task is the establishment of internationally accepted methods of analysis for the raw materials and finished products of the industry. Members of the committee carry out experimental work to assess the most desirable methods and techniques, when disagreements on these subjects cannot be resolved round the conference table. This work was continued at the Wiesbaden meeting, and by the end of the conference sufficient progress had been made for the proposal to be made that the International Association should publish a manual of the analytical methods.

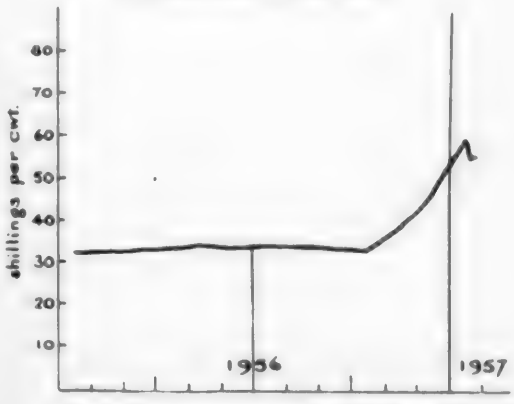
The corresponding committee of the Cocoa and Chocolate Commission met during the same week to continue a similar task, and the occasion also served to further the informal contacts and discussions be-



WORLD SUGAR PRODUCTION
42 million tons per year

FREE WORLD MARKET SUPPLIES
5·6 million tons

(Supplies from individual countries vary considerably from year to year



FREE WORLD MARKET PRICES
(raws, cif., U.K.)

tween the scientists of the confectionery industry from many countries. The next general assembly of the International Association is to be held in Brussels at the end of May, 1958, and coincides with the International Exhibition in that city. A programme has been arranged for the presentation of a wide variety of papers including such subjects as the European Common Market, colours in food, and productivity and publicity in industry, and the report of the proceedings of the Wiesbaden meeting of the technical committee is to be presented.

Pickles and Sauces

(*Concluded from page* 13)

higher acidity products, but since pasteurisation has already resulted in lower acidity pickles in this country, there is a distinct possibility that transatlantic tastes in this regard will become closer and closer.

Benzoic acid

Some manufacturers, who depend on sources abroad for some of their raw materials, have recently found that the materials have contained benzoic acid or its derivatives. Two simple tests (from French and Polish sources respectively) have been suggested. The first[13] is based on an application of Ellis's reaction to its identification and the second on Mohler's reaction. In the first, benzoic acid is extracted with ether (from acid solution) and the residue taken up in water. To 10 ml. of aqueous solution are added two drops of freshly prepared 10% ferrous sulphate and two drops of saturated potassium persulphate. The benzoic acid is oxidised to salicylic acid which gives a stable violet colour with ferric iron formed from the ferrous iron.

In the other method[14] the extracted benzoic is treated with ammonia hydroxylamine and a red colour develops according to Mohler's reaction. This is measured in a colorimeter. Salicylic acid and esters of p-hydroxy-benzoic acid do not interfere.

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Brewing

By W. A. Whitley*

Barley and malt ★ Hops ★ Haze formation ★ Methods of analysis ★ Mechanisation ★ Metal casks ★ Control of infection ★ Wild yeasts ★ Foaming properties ★ Sales

AN industry whose raw materials are natural products must, of necessity, be prepared for variations in quantity and quality from year to year. This is especially so if, as in brewing, over 90% of its basic commodity, namely barley, is grown in this country.

The past winter was characterised by lack of frost, which left the farmer with one of the worst seed beds for many years, and the prolonged drought which followed caused irregular germination with its subsequent effect on yield. The yield from the 1957 barley crop is expected to be about 22·1 cwt. per acre, which is lower than the average for the past five years.

The effect of the drought, which was followed by late rains in July, has been to give a crop with, in some areas, a much higher nitrogen content than usual, many of the samples showing around 1·7% N., and in a few cases over 2%. It is probable, however, that there will be sufficient barley in the lower nitrogen range to meet requirements, although in some quarters there is the feeling that it would be better for the health of the yeast if the brewers did not insist on such a low nitrogen figure. It will therefore be very interesting to see how the malts made from the barleys in the higher ranges of nitrogen compare with the others, especially as regards modification, and their effect on the non-biological stability of the beers made from them.

Once again, Proctor predominates as the malting barley, and although there is still some Spratt-Archer and Plumage-Archer grown, it is to Proctor that the Championship Cup for Malting Barley went at this year's Brewers' Exhibition. In addition to its being on the main list of the recommended varieties, issued by the Council of the N.I.A.B., the Institute of Brewing has now given full recommendation to Proctor as a malting-quality barley.

Hops

The other home-grown crop of direct interest to the brewer, *viz.* the hop, has done much better this year than last. The estimated production of English hops for 1957 is 266,818 cwt. as against last year's actual figure of 184,170 cwt., and of this more than 50% is grown in Kent. Of the hops being grown, only three of the new varieties have reached substantial acreages, which are still increasing. These are Northern Brewer and Bullion, which are classed as wilt-sensitive, and Whitbread Golding Variety which is wilt-tolerant. A larger acreage of this hop is now grown than of any of the other new varieties, and the estimated figure for this year is 692 acres as against 417 acres in 1956 and 207 acres in 1955 The importance of continuing the work on breeding wilt-tolerant varieties is shown by the announcement in the last report of the Department of Hop Research at Wye College of a new outbreak of Verticillium wilt in a hitherto clean college hop garden; this has been followed by the confirmation of a case of progressive Verticillium wilt at Rosemaund Experimental Husbandry Farm, Hereford.

Research on barley and hops

The European Brewery Convention held its Sixth Congress in Copenhagen last June, and it is evident from the papers read that interest is unabated, and much work on barley, malt and hops continues to be done all over Europe, as well as in America and Canada.

The question of water sensitivity in barley, described as the inhibition of germination in presence of excess water, has received further study. Workers at the Brewing Industry Research Foundation have described how it is possible to overcome this tendency, to a large extent, by interrupting the steeping of the grain by exposure to the air for varying periods before completing the steep. American workers consider water sensitivity to be one aspect of the host-parasite relationship between barley and microflora, but this may be eliminated by the use of sterilising agents.

The fact that there is often more rapid growth and root development with higher nitrogen barleys makes of practical interest some work being done on the use of substances which will restrict proteolytic activity. By this means respiration, rootlet growth, and therefore malting loss, is reduced, and the finished malt gives a significantly higher extract. Much work has

* Truman, Hanbury, Buxton and Co., Ltd.

already been done on the amylases, and attention is now being directed to the separation and purification of the other enzymes known to be present in malted barley. Since the production of haze-forming material in the beer is related to the functioning of the proteolytic enzymes, an account of some work done in America on the degradation products of β-globulin labelled with C^{14} is of particular interest. The β-globulin had been isolated and purified from malt made from barley which had been uniformly labelled with radioisotope carbon 14 by exposure of the growing barley plant to an atmosphere of $C^{14}O_2$. The experiments described indicate that only a small proportion of the chill haze produced in the radio-active beers had its origin in the β-globulin. Work done in Europe supports the view now held that in the protein-metal-polyphenol complex comprising chill haze, it is the hordein fraction of the barley protein which is involved, and not the β-globulin as hitherto thought. Of more direct interest to the consumer of beer is a study made of the amines and their occurence in the brewing process, and the confirmation of the presence of choline, one of the B-group vitamins.

This year has seen the publication of a number of papers on hops. In the absence of an agreed nomenclature for hop resin constituents, there has, in the past, been a certain amount of confusion due to the use of different terms for the same material, or the same term for different materials. This position has been greatly clarified by a joint announcement by the European Brewery Convention and the American Society of Brewing Chemists of a proposed system of nomenclature. Some seventeen terms and definitions are listed, which are, in spite of possible alternatives, considered by the Joint Committee to be the best, and most workable.

Methods of analysis

Methods of analysis have received a lot of attention from all quarters. The classical method of Ford and Tait had two disadvantages: it took a considerable time to complete the analysis, and results with old hops were not satisfactory. Collaborative analyses have been carried out by the E.B.C. and A.S.B.C. by the following methods:

(1) The method of Verzele and Govaert, employing adsorption on a specially prepared silica gel, and elution of the pure α- and β-acids by benzene, followed by polarimetric estimation of the α-acids.

(2) The charcoal method of Gough, in which resins are extracted with ether and the colouring matters removed by adsorption on charcoal, before estimating the α-acids by polarimetry.

(3) The spectrophotometric method. This has the advantage that both α- and β-acids can be simply estimated by measurement of an ether extract of the hop at three wavelengths in the spectrophotometer.

(4) The conductometric method, in which an extract of the hop in methyl alcohol is titrated with a solution of lead acetate in methyl alcohol so that lead humulate is precipitated. The conductivity is followed and the end point indicated by a sudden rise. The estimation takes about fifteen minutes.

The polarimetric method seems to be more accurate than the older established methods, and has the advantage that it gives the correct results with old hops. The newer techniques of gas chromatography and adsorption chromatography have enabled a detailed study to be made of the essential oil of hops. These methods have also been used to evaluate the amount of isohumulone and its analogues in the bitter substances of beer.

Mechanisation of hop picking has been followed by research into methods of growing hops for the machine. The most desirable characteristic is even distribution of hops along the bine, and an absence of large tangled heads, and it has been found that this can be obtained by using higher wirework.

The utilisation of the bitter principles of hops has received an increasing amount of attention, and when it is remembered that the estimated efficiency in British top-fermentation brewing has been found to be about 20% and sometimes lower, any suggestion such as pre-treatment before adding to the copper is of prime importance to the brewer, since the amount of these substances remaining in the finished beer not only influences the flavour but also the biological stability of the product.

Mechanisation

The trend towards mechanisation continues, and a visit to the Brewers' and Allied Traders' Exhibition in October gave a picture of things to come. The size of the various units shows a tendency to increase, and fully automatic washing machines can be supplied to handle up to 2,000 doz. bottles per hr. Filling machines also have a similar capacity, and these, coupled with automatic de-crating and crating machines, provide for the maximum output with the minimum of labour. An indication of changes taking place in the brewing process itself is the existence of continuous wort-boiling plant, now in experimental operation. This will, inevitably, be followed by continuous mashing procedures, and before long brewing will be, like modern sausage making, a continuous process, and not an art. The danger to British agriculture will then be that the operators of such factories will seek materials with much less variation in their composition than this climate allows.

Meanwhile, much thought continues to be given to mechanisation in maltings and bottling stores, where palletising is now the order, as with modern trucklifts it is possible to make better use of the height for storage space.

Metal casks

The use of metal casks continues, due in particular to the increase in the trade of pressure beer. This is usually chilled and filtered beer, which has been carbonated and filled into metal containers under counter pressure, and perhaps subsequently pasteurised in bulk. These containers allow the beer to be drawn off at will without risk of contamination, and

consequently the beer can be kept much longer in good condition than would be possible with an ordinary cask of draught beer. The trade in keg beer is likely to increase at the expense of that in wooden casks. The trend in public taste is away from draught beers as at present sold, due mainly to the lack of consistency, and the preference for carbonated beer can be catered for at much less cost in equipment of this type than will be possible if the output of bottled beer has to be stepped up. The capital cost of new bottling lines is very high and there is no doubt that the economic factor plays a major part in the reduction in the number of breweries which continue to function.

Fewer breweries

Some fifty years ago, when the Brewers' Society was formed, the membership was made up of 668 brewing firms, and even this number was not by any means the total number of breweries in operation; to-day the figure is about a third of the original strength, and it continues to diminish at an accelerated rate. This, unfortunately, means that eventually there will not be any local brews with characteristic flavours, and the public will be left with practically no choice, since economic factors may well divide the country up into "spheres of influence."

Microbiology of beer

It is interesting to note that, whereas in the past, breweries advertising for laboratory staff, asked for chemists, now the requirement is for microbiologists or chemists with a knowledge of microbiology. This may be a pointer to the view which, unfortunately, had been lost sight of, that brewing is a biological process, and some of the older members of the trade may remember being taught that the essential qualification for a good brewer was the ability to grow yeast, and there is no doubt that, if a healthy yeast can be maintained, then the largest proportion of the troubles which beset a brewer will disappear.

The past season has been notable for the number of outbreaks of Lactobacillus infection. Apart from the higher temperatures experienced during the summer and the longer period of time which the beers are on ullage, two of the likely causes of the prevalance of this infection may be (*a*) yeast weakness, giving rise to autolysis of dead cells, which supply the essential food materials for the lactobacilli, or (*b*) lower hop rates, coupled with lower preservative values in the hops used, and therefore reduced inhibition of growth. Since the pitching yeast is the largest source of infection, work continues on the possibility of using antibiotics as a means of controlling or eliminating bacterial infections in yeast; but since legal restrictions prevent their use in beer itself, attention must be restricted to treatment of the pitching yeast. The present position appears to be that no single antibiotic is effective against the more likely contaminants of brewers' yeast. For instance, it has been shown that, although *Flavobacterium proteus*, a common infection in top-fermentation breweries, can be controlled by the use of polymyxin-B sulphate, other more potentially dangerous organisms, such as Lactobacillus and Acetobacter, are generally highly resistant to that particular substance. On the other hand, Lactobacillus can be controlled by neomycin or bacitracin, but Acetobacter require concentrations of these substances which would be too high for large-scale use.

Other control measures

Some years ago, it was observed that under normal operating conditions, regardless of the number of times the yeast was used successively, the bacterial contamination reached a certain level above which it would not increase.

Recent work has led to the observation that the type of bacteria found varies from one brewery to another, and usually consists of only one morphological type in any given brewery. A number of factors could be responsible, but experiments indicate that the yeast strain used does have an effect on the growth of bacteria during brewing fermentations. As knowledge accumulates, the study of the nutrient requirements of spoilage bacteria, coupled with detailed information regarding the composition of wort and beer, may lead to other methods of controlling bacterial infection in yeast and beer. Meanwhile the brewer will rely to a large extent on the bacteriostatic properties of the α-acids derived from the hop, which have considerable activity against gram-positive organisms, although, unfortunately, no such effect is shown in the case of Acetobacter, which are gram negative.

As information regarding the properties of yeasts accumulates, there is an increasing tendency for brewers to consider growing their own pitching yeast, suited to the type of beer desired, and the design of the plant in which it will be used. There are several ways of growing up a selected culture for brewery use, and complete plants are available, but it is of interest to note that, at the E.B.C., a method was described in which a sufficient quantity of yeast for use in the brewery was produced in about 48 hours from a small inoculum.

Many brewers still hesitate to apply the advantages of a pure-culture system. Admittedly, it is not the answer to everything, and does require skilled laboratory control, since the character of a pure culture from a single cell may change, sooner or later, owing to genetic mutation. This means that the culture should be renewed at regular intervals from a single cell isolated from a non-uniform stock culture.

Controlling wild yeasts

The control of wild yeasts is most important, and there is a need of sensitive methods for their detection. One method, recently described, although not entirely new, consists of heating a suspension of the yeast to be tested in a water bath at 50°C. for 20 minutes. This destroys, or weakens, all the cells of

brewer's yeast, whereas a considerable number of wild yeasts survive this treatment, and may be grown on and identified by the usual means. It is claimed that very small numbers of wild yeasts can be detected by this procedure.

Another method suggested makes use of the ability of wild yeasts to grow on a medium in which the amino acid lysine is the only source of nitrogen. A most useful tool in the hands of the brewery microbiologist is the membrane filter. This is specially useful in the testing of filtered beer, particularly where sterilising filters are used, since it allows the utilisation of a much larger quantity of the sample and thus gives a better check on the efficiency, which is always in danger of dropping when the pressure rises after large quantities of beer have been passed through the filter.

Many breweries are stepping up their microbiological control with a view to establishing conditions whereby pasteurisation of bottled beers will be unnecessary, at least for part of the year. The high costs of fuel and labour are not the only factors involved, since it is well-known that pasteurisation, besides adversely affecting flavour, can be a contributory stage in the production of non-biological hazes. It was at one time thought that the rays from radio-active cobalt might be effective in place of pasteurisation, but tests have shown that, apart from physico-chemical changes, they produce most unpleasant flavours in the beer. For many reasons, apart from the legal aspect, it is undesirable to use inhibitors, anti-oxidants or antibiotics to increase the stability of beer, and in practice much can be done to achieve this by more control over plant cleanliness and attention to the air content of the bottle.

Fungus contamination

An unusual case of beer contamination was described in a report from the Forest Products Research Laboratory. The beer, which was in casks made from Persian oak, developed a sweet-scented odour, and the casks had to be destroyed. Examination of staves from infected casks showed pockets of incipient white rot in the centre of the staves. The fungus was identified as *Stereum subpileatum*, and although exposure at 160°F. for one hour will kill the infection, it appeared that the staves, which are normally steamed or heated over a flame before they are bent, had picked up the fungus from the heads, the wood of which is not heat treated.

Foaming properties

Overfoaming or gushing is a problem which is again receiving attention. Workers in America have shown that a consistent relationship exists between (*a*) the physical stability and gushing tendencies of a beer, and (*b*) the free calcium ratio and the total oxalate content of that beer. Trace metals also, in quantities of 2 to 10 p.p.m., *e.g.* iron, tin, nickel, bismuth and others, have promoted gushing in beer. European workers have also been studying the problem, and have shown that it can be cured by the addition of a trace of cobalt. They suggest that the cobalt combines with certain peptides in the beer, forming surface-active complexes which inactivate the nuclei responsible for overfoaming. Apart from being, in the amount suggested, quite unobjectionable from the point of view of health, as cobalt is a normal and obligatory component of the human diet, it has been found that the addition improves head retention and foam adhesion of the beer.

Sales of beer

The past year has seen an increase in the consumption of beer as compared with the previous one, and this is reflected in the improved financial position shown by the brewery companies. Further improvement, however, is still needed, in order that the modernisation of many older properties may continue. Indeed, it might be a good move if some of the obviously uneconomic houses were closed down, since, in many cases, there is no likelihood of the trade ever returning to its previous volume. This, of course, brings up the question of licences and, unfortunately, the position remains static, so that breweries are unwilling to part with some houses which have become almost obsolete.

Cake Decoration – a new Leonard Hill Book

IF cake decoration is to realise its full potentialities of enhancing the appetising appearance of the product, it must be more than just a display of technical skill. To achieve the full impact of its purpose, the skill must be linked with a knowledge of good design and the unique properties of the materials used in a true expression of art.

That this is readily possible is amply illustrated in a new Leonard Hill book.* The author, Miss Joan Russell, is well known in this country as the leading exponent of modern cake design, and here she sets out systematically and lucidly to explain the principles of design as applied to cake decoration, and to show the suitability of the different materials available to various treatments.

Form, colour, and lettering are dealt with in turn, and the points made are freely illustrated by drawings and diagrams. A large number of drawings and photographs of finished cakes, many of them in colour, are also included to illustrate the many effects which can be achieved by the techniques described and to encourage the decorator to attempt a more varied approach to his work.

Miss Russell teaches cake design and decoration at the Borough Polytechnic, and the book is a worthy expression of her teaching skill. It should prove especially useful to students taking the City and Guilds Examination in cake design, and there will be few cake decorators, students or accomplished practitioners, who will fail to find it a useful guide and a valuable source of inspiration.

* *Creative Cake Decoration*. By Joan Russell, A.R.C.A., F.INST.B.B. 1957. Leonard Hill (Books), Ltd., Eden Street, London, N.W.1. 42s. net.

Gay new capping strips for fruit-flavoured milk, produced by Venesta.

A new 7-lb tin for Milady toffees, made by Reads, Ltd.

Transparent bags for pre-packing fruit and vegetables, made by BX Plastics.

PACKAGING

Another Year's Progress

The food industry, with its variety and range of products, provides a constant challenge to the packaging and packaging machinery industries. Here is an assessment of how the challenge has been met in the past twelve months.

MATERIALS

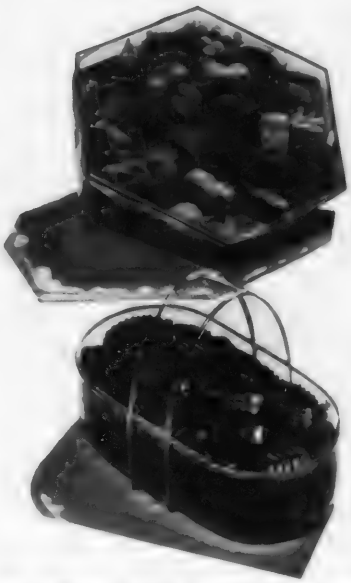
ONE of the most striking trends in the British food industry to-day is the rapid growth of self-service marketing. As more and more retail shops go over entirely or in part to this type of trade, the demand for attractively pre-packaged foods, which "sell themselves" from the display shelves, continues to increase, and many manufacturers have re-designed their packs to meet the new trade.

Transparent films

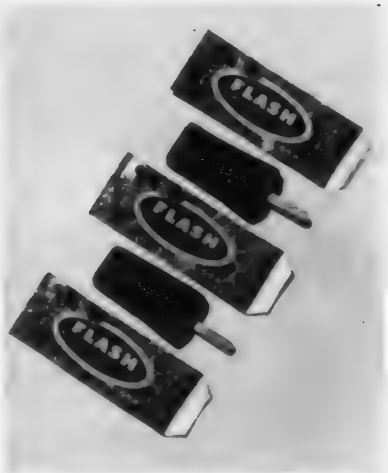
Transparent films, which display the contents of the pack to advantage, continue to grow in popularity as packaging materials. Most of the single films have their disadvantages for particular uses, however, and the search for improved materials continues. For example, regenerated cellulose film has been available for some years in a moisture-proof and heat-sealable form. These properties are conferred on the film by treating it with lacquers based on nitrocellulose and containing plasticisers, resins, and waxes. These films have proved satisfactory for many purposes, but such operations as heat-sealing, printing and folding tend to damage the lacquer and increase the moisture permeability of the film. In addition, the permeability may be increased if the surface of the packed food is itself moist. On the other hand, polyethylene films, though admirable from the point of view of moisture resistance, leave something to be desired with regard to permeability to air and are not so easily printed and handled as cellulose films. These defects have been overcome by the production of laminated films of the two materials. The Metal Box Company have introduced a new film of this kind named *Metathene*, which is a cellulose film coated with their *Diothene* brand of polythene. The film is said to be exceptionally strong, and to give a genuinely air-tight and liquid-proof heat seal.

It has been found that vacuum packaging very considerably increases the shelf life of many food products, and *Metathene* is particularly useful for this purpose. Another advantage is that the benefits of reverse printing can be obtained without the disadvantage

The new Nesquik packet, made in laminated foil by the Metal Box Co., Ltd.



Attractive semi-rigid containers for sugar confectionery are made from cellulose acetate by BX Plastics.



Flash, a new "drink on a stick" produced for the cinema trade by J. Lyons, Ltd.

of the food being in direct contact with the printing inks—the printing is sandwiched between the two layers of the laminate.

A new polythene-coated cellulose film, made by coating *Cellophane* with polythene by direct extrusion, has also been developed by British Cellophane, Ltd.

Robert Peters (Nottingham), Ltd., are now converting polythene-coated cellulose film, and can offer pouches suitable for vacuum packaging which have a lip for easy opening. At the present time they are unable to offer printed pouches.

Copolymers of vinylidene chloride have also been used for coating cellulose films. British Sidac, Ltd., are now producing a transparent film consisting of cellulose coated with Saran, sold under the code M.X.X.T. The film is very resistant to the passage of air and moisture, and is not affected by creasing, abrasion, printing, or heat-sealing. It is also said to have a high degree of dimensional stability, so that it does not easily shrink or wrinkle.

New laminated materials

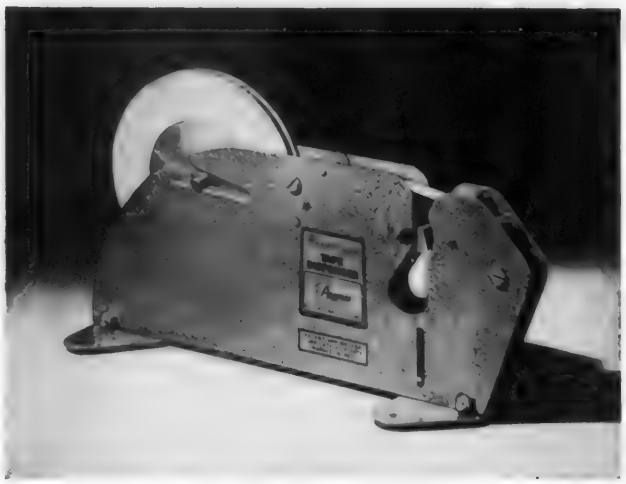
Even more complex materials have been developed by the Metal Box Company for packaging concentrated foods such as soup powders and powdered milk drinks. Their *Metalam* is a laminate of polythene-coated aluminium foil with cellulose acetate film. The acetate is reverse printed before lamination, so that the printing is protected by the film and appears against the bright background of the aluminium foil. The film is light, but tough and proof against air, moisture, and light; it can be heat-sealed by normal processes. *Metalam* is at present being used for half-ounce satchets of *Nesquik*, a powdered chocolate drink made by Nestle's.

Yet another packaging material introduced by Metal Box has no less than four constituents—cellulose acetate, aluminium foil, paper, and polythene. The acetate is laminated to the aluminium foil after first being reverse printed where this is desired; the foil is then laminated to paper coated with *Diothene*. The foil and the *Diothene* are moisture-proof, and prevent the contents from absorbing moisture from the atmosphere and so caking or spoiling; the paper adds rigidity to the combination, whilst the cellulose protects the printed design. Packs made of this material are said to be flexible and easy to open, yet strong enough not to tear or burst as a result of handling or packing.

Several other modified films have also been introduced. Robert Peters (Nottingham), Ltd., have produced a range of *Telcothene* polythene coated paper bags. Various types of paper lamination are available, each having its own particular properties; these include kraft, M.G. kraft, vegetable parchment and *Glassine*. The bags combine the mechanical strength of the papers with the impermeability of the polythene to give a robust, heat-sealable container.

Polythene-lined paper packs have also been developed by John Dickinson and Co., Ltd., who have introduced a new *Weldex* packet suitable for iced-lollies and for food and drink powders in general. The bags can be heat-sealed, and are printed with inks specially chosen to withstand the heat used in this process and also the extreme cold of deep-freeze storage.

A plasticised copolymer emulsion based on polyvinyl acetate, intended for application to other materials such as paper, has been developed by National Adhesives, Ltd. Application of the emulsion, which readily sets into a firmly-adhering flexible coating, can be accomplished by normal methods such as reverse-roller, air knife, or brush-coater techniques, or by gravure and aniline printing machines. It is subsequently dried by hot air or infra-red lamps. The coated material is easily fabricated into bags or cartons by the use of any fast-setting P.V.A. adhesive, or by taking advantage of the heat-sealing proper-



The Rippatape sealer for bags of polythene and other transparent films, made by P. P. Payne and Sons, Ltd.

ties of the coating. The amount of coating necessary depends on the degree of resistance to water, grease, etc., required, and upon the hardness of the paper size.

An interesting development in polythene film has been the introduction of irradiated polythene tape, of which pilot-plant quantities are now available from Tube Investments, Ltd. They claim that the film has all the attributes of normal polythene, coupled with a much greater resistance to high temperature and to stress cracking. The tapes are said to be completely free from radio-activity and toxicity, and they can be formulated into transparent envelopes which resist the effects of low-pressure steam and boiling water. They can therefore be used for packaging foods, which can subsequently be cooked in the containers and held in a sterile condition indefinitely.

The Telegraph Construction and Maintenance Co., Ltd., have used the extrusion coating technique to produce a thin polythene sheet reinforced internally with a thin sheet of fibreglass. Known as *Telcomesh*, this material possesses the impermeability of polythene combined with a greatly increased mechanical strength and a fair degree of translucency. It is recommended as an outer covering for large units in cold storage, or for use in the construction of conveyor belts.

A new transparent film of Continental origin is now being converted by Robert Peters (Nottingham), Ltd. Known as *Ralsin*, this film is a nylon 11 type derived from castor oil. It is manufactured in France by the Societe Organico, for whom the agents in this country are Whiffen and Sons, Ltd. The film is said to be highly resistant to fats and oils, and to the passage of water vapours and air. It is heat-sealable, and can be used for vacuum packaging.

The Nike dispenser, made by Johnson and Johnson (Great Britain) Ltd., another machine for sealing bags of transparent film, is seen here in operation.

Advances have also been made in packages produced from older types of film. John Dickinson and Co., Ltd., have introduced several new packs during the year, including bags for potato crisps and popcorn. These are made from a moisture-proof, heat-sealable grade of cellulose film and have double walls. The centre seams are gummed, whilst the bottom seams are first heat-sealed and then turned up and gummed to give extra strength to the pack.

Another of this firm's new products is the *Seal-Easi* bag for wrapping pies. The bag is made of glassine and has a transparent film window. It carries a latex strip down the back which enables the flap to be turned down to any required depth, the bag then being closed by a light pressure of the fingers. Similar bags, though in this case non-adjustable in size, are made for peppermints and other sweets.

Aluminium foil

Aluminium foil continues to find favour as a material for packaging goods in cases where display of contents is not desired, as for instance in butter packs. Venesta, Ltd., have recently developed a foil printed on the dull side, a process which is said to effect a saving of 2½d. per 1 lb. of foil. Aluminium foil is now available both plain and laminated or coated with a variety of other substances, which confer on it increased mechanical strength, resistance to corrosion, heat-sealability, etc. Some of these laminates have already been described above. They are discussed in greater detail in a new publication by the Aluminium Development Association. Entitled *Aluminium in Packaging*, this brochure describes a range of aluminium foils and laminates, as well as many other packaging materials such as cans and boxes which are now available in aluminium. Specifications and physical properties

are given for a number of foils and laminates.

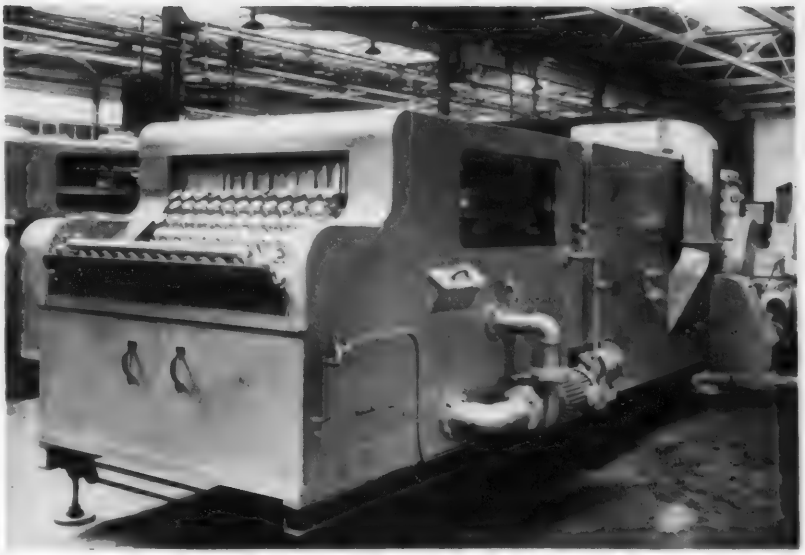
Paper

Notwithstanding the many advances made with other packaging materials, paper continues to hold its own for the packaging of many products, particularly where a heavy-duty wrapping is required. Continuous research in paper manufacture, no doubt stimulated to some extent by the competition offered by the newer materials, has led to several improved types of paper and paper products. William Palfrey, Ltd., have recently developed a new fibreglass or rayon reinforced scrim, known as *Scrimtex*, which is said to have exceptionally high tear-strength. The reinforcing material is built into the paper during its fabrication, and tears, once begun, cannot spread beyond it. The same firm has also introduced a new mould-resistant paper, *Nevermold 101*. This paper is said to have no corrosive or other deleterious effect on metals, and to retain its anti-mould properties in the face of humidity, rain, sunlight, and other climatic conditions. The paper may be used alone or as a basis for polythene coating. It is available in sheet form or ready-fabricated into multi-wall *Palfsacks*.

CONTAINERS

New and more attractive containers continue to be produced from a range of materials. Polystyrene has proved to be well suited for the production of rigid, transparent jars, which are much lighter than glass and do not break easily; when breakage does occur, the jars do not splinter.

A moulded container of this material has been produced by the Paper Cap Co., Ltd. The jar has a lip which is recessed on its top edge to hold a ring of latex sealing compound. When it has been filled with the product, an aluminium foil lid can be applied automatically by a capping machine which forces the foil over the sealing compound in the recess, thus forming a hermetic seal.



Jar washing and drying machine made by Dawson Bros.

The foil is then pressed round the outer edge of the lip.

The Metal Box Co. have also produced polystrene jars, which they make at the moment in a 1 oz. size. The jars are made to nest for convenience of storage, and they can be sealed with a snap-on polythene cap. The company hope in the future to increase the range of sizes available.

For the fabrication of semi-rigid containers, cellulose acetate has been used, and BX Plastics, Ltd., have made a range of attractive sweet caskets from this material. The same firm has also developed a collapsible container made of *Velbex* P.V.C. sheeting. The containers are suitable for transporting liquids, and offer a great saving in freight when empty, as they fold into very little room.

Cartons made from a wide variety of materials are now available for the packaging of quick-frozen and other foods. The Pearlite Box Co., Ltd., in association with the Swedish firm of Esselte-förpackning ab, have introduced a range of *Hermetet* cartons with properties to suit many different uses. The cartons can be made from whitelined chipboard or Scandinavian whitelined folding boxboard. For simple moisture retention, the lining can be of kraft paper coated with polythene or kraft or sulphited papers coated with heat-sealable waxes. More elaborate liners can be fabricated from polythene-coated paper laminated with foil, *Saran*-coated paper, and other materials. For packaging fatty foods, cartons made of paper coated with P.V.C. can be supplied. After filling, the liners are heat-sealed and the cartons spot glued. After first being opened, the cartons can be folded closed if the whole of the contents have not been used and the liner folds over to give good protection to the remaining contents. When powders are packed, a spout can be incorporated, and this does not interfere with the efficiency of the reclosure. The cartons may be printed in four colours by litho offset. Machines are also made for the automatic or semi-automatic forming, filling and closing of these cartons, and these are described later under the heading Packaging Machinery.

Metal containers

Despite their comparatively high cost, rigid metal containers hold an unassailable place in the packaging of many foods, and improvements in their design continue to be made. Perhaps the most important new introduction in 1957 was the *Skey* can, developed by the Metal Box Co. This is a new key-opening con-

tainer which has the decided advantage that the lid can be replaced effectively after the can has been opened. The lid remains attached to the body by a hinge, which is formed from a strip of metal left untouched by the key when the can is being opened.

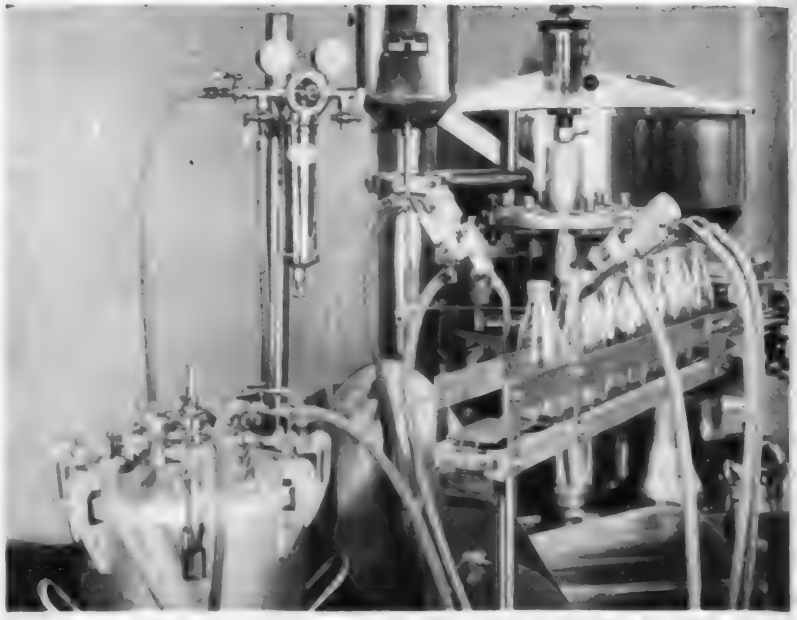
The *Skey* can has already been used for packing golden syrup and treacle by John Walker and Co., and it has obvious advantages for use with many dry and liquid foods that are not usually consumed all at one time. It can be filled at high speeds and closed automatically by methods adopted for gas, vacuum, or atmospheric packaging.

The past year has also seen a further development in the domestic sale of beer in cans, and many well-known breweries are now entering this trade. Attractively lithographed cans are universally used, and it is interesting to speculate on what effect this will have on the canned food trade, which up to now has found it more economical to stick to labelled cans for the sale of most commodities.

Unsealed tins continue to be popular for biscuits and dried foods, and Huntley, Boorne and Stevens, Ltd., have added to the range they supply during the past year. Round, lever-lid tins are now being manufactured by this firm, one of their uses in the food field being in the packaging of hospital supplies of Horlicks. Attractively printed tea tins, rectangular in shape and having hinged lids, have also been added to the list of products of this firm.

Another example of attractive printing is provided by the confectionery tins made by Reads, Ltd., for the packaging of Waller's confectionery. In a new design recently produced for this Blackpool firm, scenes of the holiday resort are reproduced from coloured photographs on a 7 lb. tin of *Milady* toffees.

Aluminium cans are now being used in increasing quantities for packaging foodstuffs, especially in the U.S.A. and on the Continent, and it will be surprising if they do not soon offer a serious challenge to the conventional tin-plate can in many branches of the food trade. Aluminium cans seem to be particularly popular in Norway, where they are used for packing fish, meat, and vegetable products and a variety of other foods.



The Thatcher NU-Glas process, machinery for which is supplied by Clarke-Built, Ltd., in operation on a bottling line.

Glass packaging

Although adding appreciably to transport costs, the returnable glass bottle, with a life of perhaps 30 to 40 trips, remains the most popular container for liquids such as milk, beer, and aerated waters. Attempts continue to be made to make the glass bottle even more economical as a packaging medium. Research has shown that if a thin film of certain materials can be deposited on the surface of the bottles, it does much to offset the weakening of the glass resulting from scratches and abrasions, and the effective life of the bottles is thereby appreciably lengthened. Stearates and modified silicones have been used for this purpose. This idea has now been put into practice by the development of the Thatcher *NU-Glas* process of bottle protection, for which Clarke-Built are now sole British concessionaires. In this process, bottles are sprayed as they leave the washer with a solution of materials said to be based on carbon and silica. The resultant film left on the surface of the bottles as the solution dries fills any penetrations of the surface which have occurred, and is said to restore much of the bottle's original strength. Longer bottle life and a 50% reduction in breakages, as well as improved bottle appearance and an increase in handling speeds, are claimed.

An entirely different method of bottle protection, suitable for the protection of fancy lines in transit, has been introduced from Italy by Spicers, Ltd. In this, a material known as *Carbion*, is moulded into sleeves or other shapes to fit the bottles. *Carbion* is a material with crossed corrugations which may be fabricated from straw paper, viscose film, cellular wadding, or laminated papers and foils. It is available in a special elastic form, which allows it to mould itself to the contours of the vessel to be protected.

Another development in the bottle trade has been a one-trip beer bottle. The bottle is only a little over half the weight of the normal bottle, and it is hoped that economies effected in transport and handling by the elimination of the collection and processing of empties will allow the bottle to compete on economic terms. The

bottle has been designed by the Glass Containers Research Committee.

Food in tubes

Increasing use is being made of collapsible tubes for the packaging of foods of a suitable semi-liquid consistency. Wilts United Dairies have introduced processed cheese spreads in lacquered aluminium tubes made by Venesta, who have recently introduced from the U.S.A. a new method of flush waxing tubes. Nestle's are now marketing condensed milk in tubes, which are also of aluminium and are supplied by Universal Metal Products, Ltd. John Dale, Ltd., are also supplying collapsible tubes for food products, and have recently co-operated in a scheme whereby they supply tubes for Keddie, Ltd., whose *Westminster* brand sauce is filled into the tubes by the specialist packers Evans Chemicals, Ltd. John Dale are offering tubes of this type with a star shaped orifice, which makes them particularly useful for the decorative dispensing of icing-sugars, chocolate and savoury spreads, and piping jellies, etc. The tubes in this case are made by the Flexible Metal Co., Ltd. This firm has now developed a method of hermetically sealing tubes by means of a thin metal membrane which covers the orifice. The tubes are fitted with a *Poliflex* polythene cap provided with a spike for piercing the mem-

Tubes made of materials other than metal are also being used for such things as icing-sugar. Kunzle have recently introduced a pack comprising four flavours of cake piping packed in small polythene tubes, whilst R. P. Scherer, Ltd., have developed an icing-sugar capsule made of gelatin.

Tape dispensers

The year has seen a considerable number of adhesive tape dispensing appliances placed on the market. A range of several such machines is now offered by Leon Davis and Co., makers of *Oyster* brand gummed tapes. Their *Spread-o-matic* is designed to dispense gummed paper tape from ½ in. to 1½ in. wide in unit lengths of from 3 to 8 in. Each pull of the handle gives the length of tape which the machine is set to deliver; multiples of this length can be obtained by pulling the handle the appropriate number of times. The *Oyster Rex* No. 4 and No. 8 machines respectively dispense tapes from 1 to 4 in. and from 1 to 8 in. wide. Lengths of from 4 to 36 in. can be obtained by a single pull of the handle. The *Oystermatic* is a fully automatic dispenser designed to deliver lengths of tape up to 2 in. wide and 12 in. long. Moistening devices for the tape are incorporated in all these machines.

Samuel Jones, Ltd., also make dispensers for gummed paper tape. The *Lightning Automatic* machine handles tape up to 2 in. wide, whilst the *S Counterboy* will dispense tape of up to 3 in. wide. Lengths of up to 14 in. and 15 in. respectively can be delivered by a single operation. The *Tape-Shooter* can dispense lengths of tape up to 36 in. from rolls of up to 4 in. wide, and an electric version of this machine which can be controlled either by hand or by foot is available.

The Industrial Sellotape Division of Gordon and Gotch, Ltd., has introduced a dispenser which allows various lengths, as well as various widths, to be cut from a standard roll of *Sellotape*. The machine has 7 cutting blades, which can be set to slit the tape to any required width between ¼ in. and 2 in. Lengths of from ½ in. to 5 in. are obtainable by adjustment of a setting dial at the side of the machine.

Tape dispensers specially designed for sealing polythene and other bags have been produced by P. P. Payne and Sons, Ltd. Their *Rippatape* industrial bag sealer allows 600 to 800 bags per hr. to be sealed with a 2 in. strip of their pressure sensitive tape. The *Rippatape Autobag* model is a somewhat lighter machine working on the same principle, and semi-automatic in operation.

MACHINERY

As the popularity of transparent films for packaging continues to grow, so the number of machines available for forming, filling, and sealing containers made from these films also increases. 1957 must, indeed, have been a vintage year for such machines. A hand operated sealer for bags of polythene and other heat-sealable films is

The Speed-Vac, a Swedish machine for forming, filling and sealing transparent packs.

now available from the Hypack division of the Oppenheimer Casing Co. (U.K.), Ltd. Known as the *Hypack Polysealer*, the machine is operated by the knuckles of the hands holding the bag or tubing to be sealed, and it is claimed that a speed of 500 operations per hr. can be achieved. The machine is adaptable for wall mounting for the sealing of bags containing liquids or free-flowing powders.

A vacuum heat-sealing machine has been introduced by the Metal Box Company, Ltd. The machine must be hand fed but is otherwise fully automatic. It incorporates an endless feed and discharge belt, a high-vacuum evacuating chamber, and thermostatically controlled sealing bars. To operate the machine, packs are placed by hand on the rubber belt, which carries them into the vacuum chamber. This then descends over the packages, vacuum is drawn, and the heat-sealing bars are brought down. When the sealing operation is complete the chamber opens and the sealed bags are discharged on to a sloping platform for gravity delivery.

The operating speed is from 25 to 30 packs per min. for single packs, which may measure up to 13½ in. by 11 in. With packs that are small enough to be placed side by side on the belt, correspondingly higher speeds can be obtained. Gas flushing of the chamber may also be carried out, but this reduces the speed of the operation.

New Continental machines

Felber, Jucker and Co., Ltd., are agents for a range of machines of Swedish, Dutch, French and Italian origin introduced into this country in 1957. The Hugin *Speed-Vac* originates in Stockholm, and combines the processes of forming, filling and vacuum sealing bags from transparent film. It is said to be particularly suitable for the vacuum packaging of sliced meats, and has been developed for the English market with special equipment for handling sliced and shingled bacon. It can take sliced bacon from the conveyor belt, feed it into the machine automatically, make its own bag and place the bacon inside, and finally seal the bag under vacuum. Packets up to 6 in. by 8 in. are handled at a rate of 24 per min., whilst larger bags of 6 in. by 14 in. give an output speed of 12 bags per min.

The 410 JJ Triplex continuous hydro-electric washing, de-labelling, rinsing and sterilising machine made by Robert Kellie & Son, Ltd.

A smaller machine for vacuum packaging in transparent film, known as the *Souvidex*, is made by Laroche Freres, of Paris. This machine is also used for packaging meat products and a range of other commodities, and it is adaptable for packaging in an inert gas where this is desired.

Other packaging machines handled by Felber, Jucker and Co., include a bag making machine of Dutch manufacture, capable of making bags up to 20 in. wide in lengths from 2½ to 80 in. at speeds up to 950 per min. It is hoped shortly to increase the maximum width obtainable to 30 in. The *Ital-Pack* is manufactured in Turin, and is used for packing tea, herbs and spices, etc., in envelopes, at a rate of between 3,000 and 4,000 envelopes per hr.

The Pearlite Box Co., Ltd., are now marketing a machine, the *Hermic X*, for the fully automatic forming, filling and closing of the *Hermetet* cartons previously described. The cartons are first glued and heat sealed, and are then filled with the commodity to be packed. Filling can be on a volumetric or weight basis as best suits the particular substance. The cartons are then closed, and can be coded if desired.

A semi-automatic machine, the *Hermic 2*, is also available for dealing with smaller outputs.

Washing machines

Where empty containers are returned for re-use there is always a serious handling problem, and new washing units regularly appear on the market. Several new bottle washing machines were on show at the Dairy Show, and some of these were described in the December issue of FOOD MANUFACTURE. Dawson Bros. make a wide range of washing equipment, one of their latest additions being a jar washing and drying machine which handles all sizes of jars at a range of up to 200 per min. They also make a washer suitable for installation in canning lines, which washes, rinses and dries the cans. The cans receive a detergent wash and a hot-water rinse before finally being dried with a current of hot air.

Robert Kellie and Son, Ltd., have recently introduced a machine for the washing, delabelling, rinsing, sterilising and drying of returned biscuit tins. This is their new 410 JJ *Triplex* model, which can handle 16,000 tins and lids in an 8 hr. day. Three detergent rinses, one cleansing rinse and a final sterilising rinse are given,

each tin receiving about 5 min. treatment.

Labelling machines

An improved straight-through can labeller, the *New Way* model E, is now being made by Purdy Machinery Co., Ltd. This incorporates an elevating feature with high discharge, allowing a direct feed into certain models of caser. The machine also has thermostatically controlled heaters for the gum pot, and a paste belt which does not dip into the paste pot but receives a narrow bead of paste from a disc revolving in the pot. The machine will label a range of cans and other cylindrical containers, and it is claimed that change-over from one size to another can be effected in 30 sec.

Purdy's have also brought out a new machine designed to provide a clean and trouble-free method of feeding gum into the troughs of labelling machines. Known as the *Gum-Gun*, this unit is in the form of a 10-gallon tank mounted on castors for easy transport. The tank is equipped with a gear-type masticator, through which the gum is dispensed or recirculated continuously when the machine is not in use. This breaks the gum down to an intimately mixed, free-running condition, and maintains it in this state. The gum is fed to the labelling machine via a flexible metal hose, which is supported on a rigid frame.

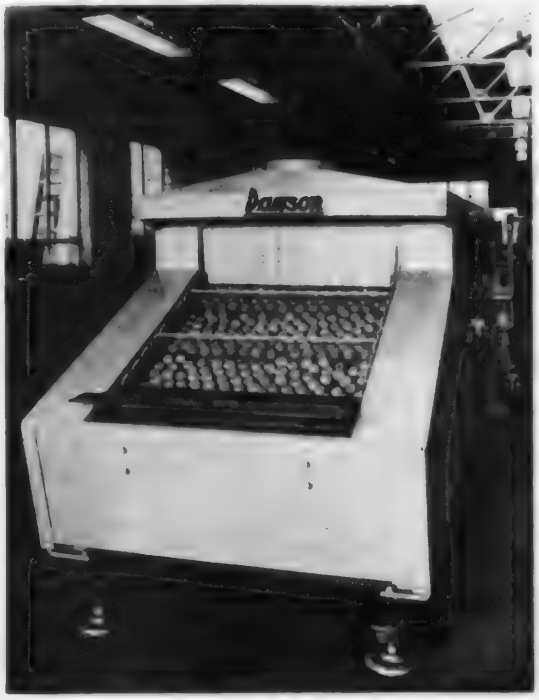
Packaging Machinery (Peters), Ltd., have introduced a fully automatic version of their *Pony Labelrite* machine for labelling bottles. The machine has a variable speed operation, and will label 30 to 60 bottles per min. with large bottles or 60 to 120 per min. with small bottles, which it handles two at a time.

Fillers

A number of new filling machines were also exhibited at the Dairy Show and the Brewers' Exhibition. The latter was made the occasion for the first public demonstration of the A.P.V. Co.'s new *Fox* filler. This is made in several models, with capacities varying to suit different sizes of establishment. The "Speed 40" Model "H," for example, has a capacity of 12,000 bottles per hr.

Albro Fillers and Engineering Co., Ltd., have also added to their range of filling machines, and are now offering an interesting vacuum operated powder filler capable of filling such commodities as custard powders, instant coffee, etc., into tins, drums and bottles at speeds up to 150 per min. Smaller models are also made to cater for lower outputs.

For carton filling, an interesting introduction has been the Canadian designed *Perga* M filler, illustrated in the December issue of FOOD MANUFACTURE.



A steriliser for oranges and other fruit made by Dawson Bros.

Beef preserved with antibiotic

IT is reported that *Biostat*, a food-preserving formulation of the antibiotic oxytetracycline, has been used successfully in the preservation of fresh beef and mutton under severe tropical and semi-tropical conditions. Three scientists employed at the Kenya Government research laboratories have described the results obtained by treating the meat in various ways. A solution containing 20% of the antibiotic was used as an intraperitoneal injection, as a dip, and as a spray, and the meat was examined after 24, 48, and 72 hr. periods.

Although they reported favourably on the intraperitoneal method, the authors reject the method as unsuitable on practical grounds for the busy abbattoir. The dip method was also rejected on practical grounds. With the spray method, the period during which the meat remained fit for human consumption was extended from 48 to 72 hr., provided the initial slaughtering was carried out hygienically. Particularly good results were obtained with beef. The colour and odour of the meat were also considerably improved. It was confirmed that remnants of the antibiotic in the meat are destroyed by cooking.

The authors conclude that although the antibiotic cannot in its present form and strength replace cold-storage, "it is able to prolong the keeping quality of meat to such an extent as to satisfy the meat trade in hot and underdeveloped countries." They also point out that treated carcases resisted clostridial spoilage.—A. Ginsberg, E. C. Hill and J. M. Grieve, *Veterinary Record*, 1957, 69, **42**, 983.

The Evolution of Container Closures

By George B. Beattie

The most surprising fact emerging from this historical survey of closures—based on sources ranging from Horace to Her Majesty's Patent Office—is that very few of our present techniques are particularly new. Screw caps, swing stoppers, cap seals and crown corks all had their counterparts in the past.

CLOSURES—especially bottle stoppers—have always had a mesmeric attraction for inventors, and it has been estimated that up to 1900, over 20,000 patent specifications relating to closures or closuring had been issued in the U.S. and U.K. alone. In the year Painter[1] patented his crown cork or cap, U.S. bottlers had over 2,500 existing patent bottle closures from which to choose; this without any reference to jar, drum, keg and other container-type accessories.

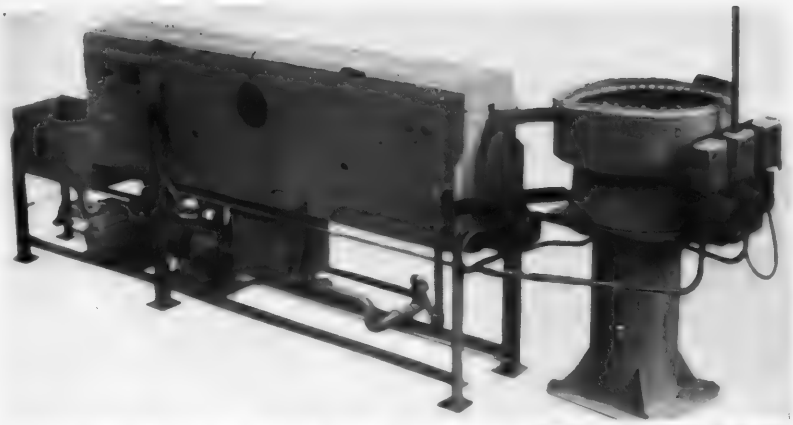
Balls of clay or pitch used to seal gourds were probably the first "closures." Corks as stoppers are mentioned by Horace, 65 B.C.[2]—"The cork, fast-bound with pitch shall draw"—and also by Pliny; whilst, although an 1872 official work[3] states that no cork relics had ever been found in Egypt, hence the ancient Egyptians could not have known cork, in 1911, Flinders Petrie, at Hawara, unearthed a corked bottle neck and some cork soles ascribed to the second century A.D. Large corks with pitch sealing compounds were used for the wide-mouthed Roman oil and honey jars, but after the Roman era little is heard of cork for many centuries. Dom Perignon, a monk is often credited with the (re)invention of the bottle cork, which he used for champagne in the latter part of the seventeenth century, but there are plenty of previous references to prior usage; the earliest being by Palegrave in 1530—"Stoppe ye bottell withe a corke." Shakespeare, probably in 1611, mentions corks in *The Winter's Tale*—"As you'd thrust a cork into a hogshead." In fact, from this quotation it would seem evident that bung or tap corks for large containers, as well as bottle corks were then well known. An invoice of W. Proctor, dated October 28, 1662, includes "2 gross of glass bottle corks, 4s." Curiously enough, the corkscrew or, as then known, "Bottlescrew," does not seem to have appeared until the early years of the eighteenth century; though corks had become so popular that the firm controlling the Niederselters spring used in 1781 nearly 2¼ million "cork stoppers," an interesting sidelight being that all retailers contracted to return them. They were then forwarded to a Strasburg cork cutter who converted the returns to smaller corks!

Old patents

A well-known reference work of 1851[4] stated that then, cork-making plant was new and "untried," practically all corks being hand made, but examination of the patent office records shows that this suggestion must be wrong. The earliest British specification is probably that of T. Crowley, April 26, 1777, which describes a hide cutting machine which can, by fitting saws, be converted to a cork cutting device.[5] From the wording, one might doubt whether cork *closures* would be cut by such a machine, but there is no doubt at all over S. Miller's 1795 invention, for he explicitly states that "in cutting bottle corks the slab is placed edgeways to the tool," and corks "of cylindrical shape as used by London brewers."

One early nineteenth-century authority has described with woodcuts the evolution of the corkscrew.[6] According to him the first method of opening a corked bottle was simply to knock the neck off, and it is of interest to note that much later bottles were sometimes purposely made with extra necks which *had* to be broken off as an anti-pilferage plan. Thus, Butler and Price,[7] in 1879, suggested the addition of a ring about the mouth which had to be snapped off before the contents could be poured out, the bottle being then "incapable of being re-filled." The first cork remover,[8] other than fingers or teeth, was a nail which disintegrated rather than pulled the cork, nails being later bent or notched. A further "improvement" was the use of two thin nails or skewers inserted obliquely from opposite directions, these being finally given a slight spiral form as with meat skewers. From that it was a mere step to a spirally bent, sharpened wire, the prototype of the corkscrew, a handle being added as an afterthought.

Probably the first bottle corker is that described by Miller in his 1795 specification.[5] This comprised a hook holding the bottle neck, a metal piece perforated with a circular hole "something less than the cork" and a rack worked by a pinion and handle and provided at its lower end with a plunger to force the cork through the hole into the bottle. There would appear to be over a hundred British patents granted between 1777 and 1866 covering corking machines or devices,[3] and in the same period 25 specifications described corkscrews. Sundry inventors, too, tried to contract out of the corkscrew problem. Thus, G. Cartwright,[9] in 1859, suggests for bottles, and particularly for wide-mouthed jars, the fitting to the closure of a loop of string, ribbon or wire passed through the cork and protruding from the latter, the "bottlescrew" thus being rendered unnecessary. Variations of this idea keep crop-



Courtesy R. W. Webster & Co. Ltd.

Fully automatic deep or shallow screw cap washer and steriliser for all plastic types, with vibratory feed hopper on right, operating on hydro jet principle, with discharge to baskets at left.

ing up for many decades in our patent records and also in those of the U.S.A., typical examples being the ribbon device of Griffin[10] and the plug with hook stopper of Clark.[11]

According to Wilkinson,[12] ancient Egyptian wine vessels were closed with a saucer-like cover, encased in clay, gypsum, pitch, mortar or other composition stamped with a seal. We have here, therefore, a very early indication of one of the cork's chief competitiors, the "cap" or "capsule" form of closure, and also an early example of closure identification or "decoration." Another point raised here is the improvement of the sealing quality by use of a resilient, impervious substance. Many early British patents illustrate the then widespread belief in the need for such supplementary treatment.

Cork treatment

Probably Dom Perignon was the first to use really tight-fitting corks. These corks received no special treatment, but many such pre-treatments were patented in the nineteenth century. Miller[8] contents himself with "boiling or steaming," but Baxter,[13] 1866, describes an elaborate method of "filling the pores of cork, etc.," with paraffin wax, a plan still sometimes used. A. S. Stocker,[14] in 1851, conceived the idea of capping each corked container with a metal "capsule" which was lined with a gutta percha disc so that the sealing quality of the cork was greatly enhanced. Parenthetically, the same specification describes what would appear to be one of the first "cork stoppers," a plug of cork fixed at its upper end to metal or glass top, the plugs fitting "closely against the interior of the rims." A. Pritchard[15] constructed a special corker for handling *square*-sectioned corks into normal round-mouthed bottles or jars, the idea being that because of the enormous compression at the corners the corks were far less likely to fly out again.

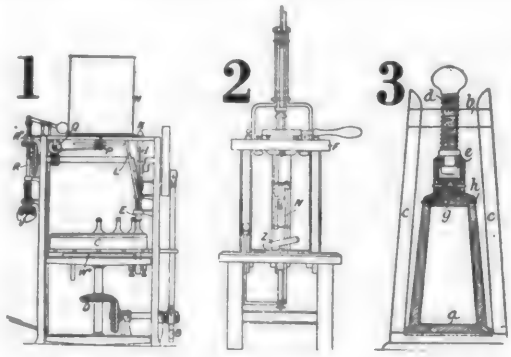
Shrink-fit capsules and the dipping of bottle necks after corking into quick-setting plastic compounds are modern ideas, but patents covering similar ideas can be found in the earliest volumes of abridgements. B. West,[16] however, went one better in 1845, proposing a method of "covering the tops of bottles, jars, pots and other similar vessels . . . applying the electrotype process for the deposition of metals around, upon and over the upper surface of containers and corks, etc." The closured containers were inverted into an electrolytic bath of copper sulphate, the current covering the parts in a short space of time.

One considerable difficulty was the ease with which even tight-fitting corks popped out with rise in temperature as a result of liquid expansion, particularly when the product was gasified, *e.g.* beer, champagne, mineral waters. Corks were first tied down with twine, then wire was substituted, but inventors were always busy trying to devise something neater. One notion, which must have been granted letters patent at least a score of times up to the early years of this century was to make two holes in the bottle neck opposite each other, a pin or "nail" being driven through, the first appearing in 1843,[17] practically identical replicas were patented from time to time later.[18-21] Another idea was the wire clasp (British Patent, 1871, No. 1,439), usually credited to H. W. Putnam, the American patent stopper "king." This was merely a prefabricated wire arrangement which was placed by hand on each corked neck, the free ends being twisted tight by a hand tool or in a simple machine. But the idea had been explored by many British inventors long before. Thus, Stocker,[14] in 1851, describes a wire loop with a catch or hasp to be used similarly.

The cork challenged

The three chief challenges to the cork came from (*a*) caps or capsules in which the chief difficulty —solved when Painter invented the crown cork in 1892—was that of positive retention without cumbersome extraneous parts; (*b*) covers or plugs held in place by some form of screw, *e.g.* plug screw stoppers, external screw caps, combinations of the two, etc., and (*c*) the bail and lever or wired swivel type of stopper. It is difficult to say with certainty which was first in the field.

The threaded screw cap and the roll-on seal are regarded as quite modern, but S. Parker,[22] in 1835, describes a "stop or stopper" which can be said to partake of both principles. The cap was of hard metal, but a ring of very soft metal was attached to the rim interior, the bottle neck having an external thread finish, so that on screwing up the closure the soft metal formed an opposing thread. An 1842 specification[23] mentions screw caps as though they are very common forms of stopper, and from 1855 to 1865 examples of external screw caps by Brooman, Johnson, Wilson, Chrimes, Jen-

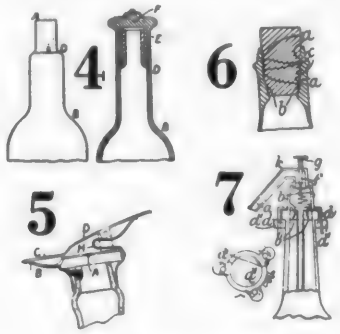


Early Devices

1. A. Ardouin's combined corking and capsuling unit fitted with rotating feed table C driven through gearing D, corks being automatically fed from hopper N via chute L to tube E and driven home by plunger K. Brit. Pat. 2,386; 1855.

2. J. Denis's corker, Pat. 2,869; 1856. Bottle stands on rest Z, rack N being actuated by hand lever above platform F.

3. Early fumigation bottle and closure frame by J. Taylor, 1856, No. 1,478. Bottle a *is placed in frame* c *with bar* b *through which screw* d *passes, socket* e *connecting with rubber bung* g *seating on washer* h. *To release gas or vapour unscrew; to seal up, screw down.*



Very Early Closures

4. Stopper by J. Scott, No. 876; 1857. As seen on left bottle neck has shoulder B, secondary shoulder D and narrow top ring A. Hollow stopper E with washer F is cemented to bottle or may be held by wires.

5. Clark and Austin's jar closure, No. 435; 1856. Rubber or metal cap A has a formed spout B closed by cover C, all controlled by thumbpiece D and spring H.

6. Early screw "stopper" by F. Simpson, No. 1,722; 1856. The bottle mouth bore was contracted conically as at b, *screw threads* a *being formed in the glass with flat pieces* c *between the threads. Ordinary corks were used, no wiring being needed for gaseous drinks.*

7. A syphon head closure for bottles by L. L. Bequemie, No. 1,542, 1857. Cap a *is fitted to vessel by screw ring* d', *piston being actuated by knob* g, *product issuing through spout* k.

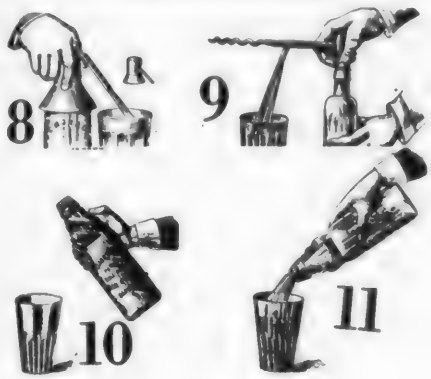
nings, Fox and others received letters patent. The "Fox"[24] caps are especially interesting as aside from a shallow pattern, he illustrates a pre-formed deep style which is very like the modern deep caps now being used for certain sauces, mineral waters, beers, etc. Vallet[25] used a deep cap in concert with a small internal plug of cork, rubber, etc., in 1875, and a "roll-on" style was suggested by Clark[26] in 1887. The first "plastics" type was apparently patented by Menke[27] in 1890, though the composition he used would not, perhaps, be regarded as a "plastic" today.

The "bail and lever" or "swing" stopper has never been as popular here as on the Continent, though a large mineral water firm[28] uses nothing else for its 26⅔ oz. flagons, and sterilised milk is often packed with such stoppers. The only British maker now,[29] tells me that they are selling more than before the war. Developed from the idea of wiring corks, the first swing stopper was probably that of Bewley and Owen, 1844.[30] This comprised a metal cap attached to the cork plus a wire clasp. But the most salient group of bail and lever devices of the time is that described by A. G. Chalus[31] in his 1856 specification. There are over 30 sub-types, many identical with present-day swivel stoppers as employed by various continental brewers. In most cases plug stopper parts are of porcelain (now universal), wood or glass fitted with a washer, but provision for use of washerless "elastic material" is also made. Many special wire arrangements have been the subject of scores of subsequent patents, but Chalus would seem to have anticipated most of them!

Cap types

Apart from external screw caps we think today mainly of "crown" patterns which owe at least "inspiration" to the original 1892 design by W. Painter. But a "tailor-made" cap, which must be the great-grandfather of the foil types used for milk bottles and fashioned and applied in one operation by automatic machines today, was invented by R. Griffiths in 1856. The cap was formed on the bottle in a special device which sheared off surplus metal. Poor chap, his application, No. 936, was, for some occult reason, *refused*! Who would be a pioneer?

Around the mid-century, William Betts was undoubtedly the capsules king, but at that time the word "capsule" was used loosely, meaning either a subsidiary cap to be applied after corking (the modern usage is for a deep cap) or the same word was applied to sundry primary closures of the "cap" style. Betts' inventions seem to cover both varieties, and in an 1844 specification (No. 10,449) he and Stocker describe a cap which is apparently of the R.O. type for use with an externally threaded bottle neck. With Jacob, No. 11,981, 1847, he appears to have originated the idea of labelling by capsule, using gold or silver leaf, etc., and in 1849, No. 12,415, describes a "new material" (lead and tin combined) for the making of capsules which are clearly of the type for which we use the name today. His father, J. T. Betts, also took out several patents for capsules and capsuling machines. In one of these the cap was pressed on by a

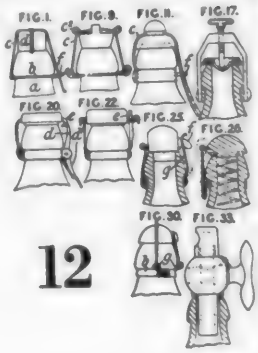


Opening and Resealing

8. *Syphon type safety opener for ball-stoppered bottles by Jackson and Sutherland, No.* 10,968; 1884.

9. *Combined corkscrew and syphon type opener for same purpose by M. Perkins, No.* 10,874; 1884.

10 and 11. *A modification of the standard Codd's bottle by Dan Rylands, the ball being released by pressing a minute valve button in the neck, circa* 1883.



Swing Stoppers

12. *All drawings are from specification No.* 2,088, 1856, *by A. G. Chalus. Figs.* 1, 9, 11, 20, 22, 25 *and* 30 *are similar to current Continental types. Nos.* 17, 26 *and* 33 *are rather weird alternatives now never seen.*

special machine and held by the pressure of a cord under the rim of the jar, etc., or by strips of rubber coated with adhesive—the first adhesive tapes for sealing purposes? Many of W. Betts' patents are concerned with machines for making the capsules, but an extra heavy capsule which can be used as a primary closure is described in 1859, No. 133, also 1859, No. 1,602. Capsules with coloured trade marks thereon are covered by No. 2,798, 1859, coloured embossments of all kinds by No. 2,727 the same year. W. Edward Newton also described screw caps and other types in his 1852 patents, Nos. 178 and 610, with machines for their fabrication. As early as 1840, however, we find W. Brockedon all but forestalling Painter's crown cork with his "tinned iron discs," No. 8,369, and F. J. Beltzung got nearer in 1852, No. 14,059, with his metal caps "with a cork lining," gutta-percha caps, unlined being also described.

Many early specifications quite frankly dodge the issue of secure retention on the bottle or jar, but the bayonet catch or engaging lug style appears to have been very popular. Thus, an earthenware cap for large wide-mouthed jars by H. Doulton, No. 1514, 1859, has wide lugs, the joint being made by a rubber washer on rotation of the cap. A bayonet catch style, applicable to all kinds of vessels, including very wide-mouthed ones, is noted by J. H. Johnson in 1860,[32] while what appears to be the first press-on disc type with beaded edges for wide jars is covered by J. G. Jennings, No. 334, 1861. Elaborate retaining devices such as spring assemblies, pressure bars, etc., were often incorporated, and O. Saulay, in addition to cementing his container and having a rubber washer "across the top," used lugs in the neck and a top arrangement with a pressure bar where "pressure is exerted by a helicoidal spring . . . between cap and plate."[33]

Screw plugs and other special stoppers

The invention of the internal screw plug stopper is ascribed to Henry Barrett in 1872, although his first patent is some years later.[34] Like Painter's crown, it has remained very largely unchanged throughout the decades, although thousands of modifications have been patented, the only passably successful one being the Riley chisel-head,[35] designed to facilitate machine handling in bottling. Screw stoppers are made in all sizes, usually for narrow-mouthed bottles, although large types in ebonite, plastics, resins, glass and lignum (the last two rarely now) are made in fair numbers. The ebonite type is by far the most common, the mix of rubber, fillers, etc., being masticated and passed through rollers to be discharged as $\frac{3}{4}$-in. thick sheets 2-3 ft. wide. It is then cut to strips, then to "quantities," tapered cylinders containing just the right weight for a single stopper. These are moulded in a press, threaded shank, shoulder and lettered head being formed in one operation. The soft stopper is then vulcanised for 4 hr. at 300°F. under 50 lb. sq. in. steam pressure to harden it. In practically all cases, the joint until very recently has been made by a rubber ring, though of late some pilot experiments with special grades of polyethylene have shown promise. A more challenging invention is a plug screw stopper of orthodox shape, but in moulded polyethylene of a grade resisting 200°F., and with no added ring, the plastic making its own joint.[36] A Midland firm[37] is now making hollow screw stoppers in styrene, or for very acid products, styrene-acrylonitile. Available in a wide range of bright colours, each stopper has a medallion top which may be in a contrasting hue, embossed with name or trade mark. They are, unlike some filled plastics types, moisture proof and easily washed and sterilised, resisting heat treatment well.

Internal stoppers

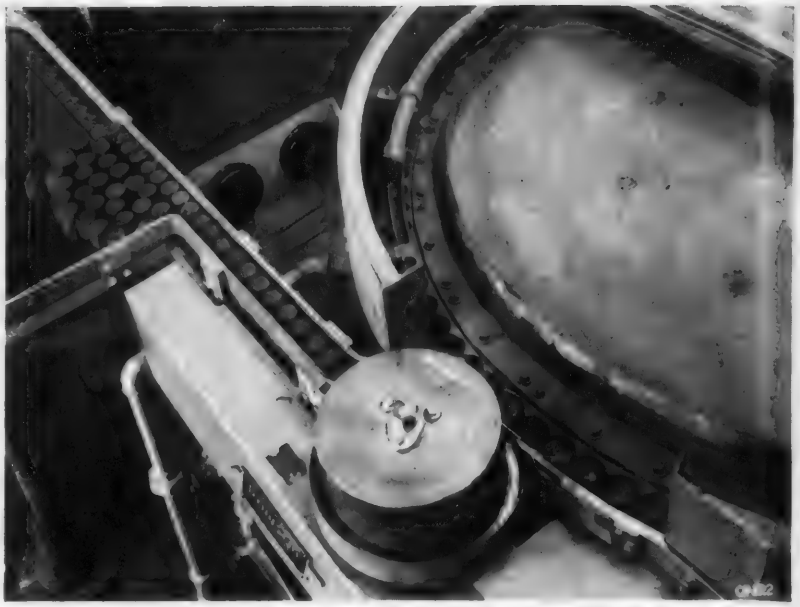
Internal closures, which remained permanently in the bottle, were used almost exclusively by the mineral water trade for a long time. For the most part they comprised various balls, plugs, bobbins, etc., the joint being made with a rubber ring or other washer

seated in the bottle-neck. Most came into one of three groups: (i) where the stopper dropped to the bottom of the container on opening, (ii) where it was held by indents in the glass, and (iii) where the ball or plug floated when released. W. Stewart is regarded as the inventor of the floating ball (U.S. Patent, 1882), but in 1864 two British Patents for such a stopper were issued to J. H. Johnson, Nos. 225, 2966, for Hamilton and H. B. Goodyear. The most popular was Codd's bottle with a glass ball stopper held by indents on opening and patented in 1870. The "Codd," like all others in this group, required gas pressure within the bottle to make the joint and all were usually only employed for carbonated goods. However, some interesting patents concerned machines which, by applying air pressure momentarily, could fill and seal these bottles when a still product was used. Codd and his partner Rylands produced not only dozens of variants on the original "Codd," but scores of other "new" stoppers, including all kinds of balls, bobbins and plugs of wood, cork, rubber, glass, gutta percha, etc., numerous different indents, a filling machine and several other types of special bottle closures. These bottles were used until the 1930's, but were always expensive, easily broken and rather dangerous.

Syphon and re-seal closures

An idea which has always attracted the closure inventor is that of providing a stopper like a syphon head so that it could be screwed on or otherwise attached to an ordinary bottle. Probably the oldest example (if we except the "hollow corkscrew" of Deleuze and Dutilleul, 1829) is an elaborate stopper by Moses Poole, No. 10,698, 1845. This was virtually a syphon head with a simplified coupling to attach to the neck.

Such closures can be regarded as "re-sealers," but it is customary to regard re-sealing as a fairly recent American innovation. This is far from being so, although many bottle re-sealers have been patented in America in the last few years. But E. Templemore described a double strap and buckle re-sealing device in 1864, No. 1650, and Charles Bathoe,[38] in 1866, claims an elaborate padlock device for use on wine bottles, "after the cork has been withdrawn." Before either of them, W. Taylor[39] had, in 1853, patented a perforated slidable re-sealing stopper. All these were very clumsy indeed as compared with modern types, *e.g.* the polythene "crown" type broadcast by a well-known brewery. The main purpose of such things is to conserve CO_2 in large bottles when the primary seal is a crown or other 1-trip device.



Courtesy Dawson Bros. Ltd.

Feed end of the new Dawson washer and steriliser for plastic caps of various kinds.

New crowns for old

Many improved crowns have been claimed since the Painter invention, but the original design was not seriously challenged until comparatively recently. The most successful modifications were discs of foil, paper or plastics on the composition cork to prevent contact with the product, and the employment of certain tear-off pieces when the shell is of aluminium or other soft metal. During the past two or three years, a corkless crown has been in production and appears to have certain merits, inertness, uniformity and simplicity among them. A vinyl resin compound is flowed into the tinplate shells and pressed to form the liner, three concentric rings being formed where the bottle locking ring makes the joint.[40] A German inventor has also taken out a British patent[41] concerning a liner of a "solid high polymer plastic deformable substance"; while a French organisation[42] has perfected a special polyethylene grade which is being extensively employed not only as a crown shell lining medium but also in place of rubber for bungs and in ring form for screw stoppers, discs for deep and shallow external screw caps of plastics and metal, etc.

Whether such new departures in crown design and also the shorter skirt crowns now being produced in the U.S. will take over completely is a talking point among modern bottlers. Another question is whether various tough plastics screw caps, especially the deep patterns, will eventually oust the "Barrett" style of screw. It is impossible to enter on such controversial issues, but it can be said that container closuring continues to progress and that no stopper, however ingenious, can claim to have reached finality.

(Concluded opposite)

Advances in Food Technology

OILS

New Refining Method

Most of the conventional refining methods for vegetable and animal oils entail fairly considerable losses of oil, especially in the neutralisation stage. More modern methods, based on continuous processing and designed to reduce the neutralisation losses, are usually rather complicated and call for costly apparatus and specialised personnel. Also, they are often not flexible enough to permit of frequent variations in the quality of the crude oil to be treated. A new process, developed by G. and S. Vaccarino, is based on the use of acetone as a dissolving agent. Unlike other agents used for this purpose, acetone is inexpensive and recoverable; it dissolves perfectly in oils and water, and also has the advantage that it can serve, at the same time, as a de-gumming agent. A Vaccarino plant for intermittent operation is already working in Italy.—G. and S. Vaccarino, *Oléagineux*, 1957, **12**, 623.

MEAT PRODUCTS

Materials for Sausages

The German Meat Research Institute, Kulmbach, has carried out comparative tests to determine the suitability of different coating materials for dry sausages destined for export which should be kept in storage for at least 45 days for adequate stabilisation and preservation. It was found that the weight losses incurred during that period could not be appreciably reduced by the use of normal commercial sausage coatings, and that the latter were liable to promote mould formation. However, by using wax coatings or vacuum foils, the weight loss can be reduced from about 9% to below 1%, and a good keeping quality can be guaranteed even if transport and storage conditions are unfavourable.—W. Gisske, *Die Fleischwirtschaft*, 1957, **10**, 599.

Uses of Ascorbic Acid

The meat industry is becoming increasingly interested in the use of ascorbic acid (Vitamin C) for the treatment of fresh meat, cured meat and the cut surfaces of meat products. Experiments carried out at the Institute for Food Hygiene of the Free University, Berlin, showed that an addition of a 1:2000 concentration of ascorbic acid permitted a reduction of the quantity of nitrate curing salt to two-fifths, without prejudice to the reddening and colour-keeping effect. In the case of dry sausages, 60% of the Vitamin C admixture can still be detected five weeks after manufacture. But Vitamin C is not able to arrest or "camouflage" the ageing or decomposition of the products.—H. J. Sinell, *Die Fleischwirtschaft*, 1957, **9**, 687.

BEER

Glucose Oxidase as a Stabiliser

Deterioration and spoilage of beer caused by oxidation are shown to be reduced by the addition of minute quantities of a glucose oxidase preparation to the beer after fermentation.

In the enzyme system, the glucose oxidase catalyses the oxidation of glucose to gluconic acid and hydrogen peroxide. Catalase present in the glucose oxidase preparation then breaks down the hydrogen peroxide to water and oxygen. The net result of the reaction is that free oxygen is removed from the beer.

The glucose oxidase used in the experiments was a commercial product, available in both powder and liquid form. The amount needed to stabilise beers was only 1 ml. or ½ gm. per barrel of beer.

In pasteurised beer it was found that glucose oxidase inhibited the oxidation reaction and decreased the iron pick-up from the can. In draught beer the results showed that yeast spoilage was retarded. D. W. Ohlmeyer, *Food Tech.*, 1957, **10**, 503.

Container Closures

(*Concluded from opposite page*)

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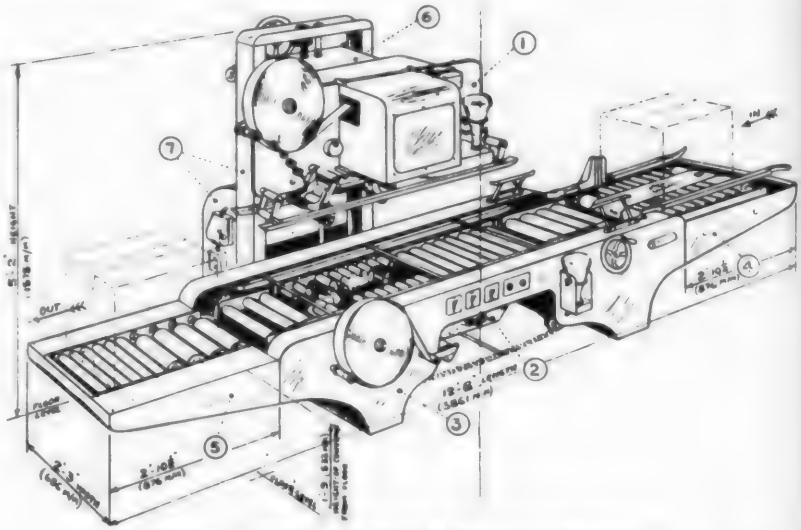
Machinery and Equipment

CASE TAPING UNIT

Sales of Adams Powel machinery are now being handled by the Soag Machinery Co. A new addition to their range of packing equipment, the Mark II automatic case taping unit applies gummed paper tape 1½ in. to 3 in. wide to the top and bottom centre seams of cases.

The unit can handle containers between 6 in. and 15 in. wide and 6 in. and 20 in. in height and easy adjustment is claimed. Standard equipment includes a case timer which spaces the cartons for acceptance when the machine is being used as a complete unit.

When fitted with an automatic device for tucking in the flaps it may be operated without an operator. When using 20 in. dia. rolls of gum strip (about 5,000 ft.) the machine will run for about 3 hr. before the reel has to be changed.



The new Adams Powell Mark II case-taping machine.

LEVEL CONTROLLERS AND INDICATORS

Instruments for the detection and control of the level of liquid and solid materials in tanks and other storage vessels have been manufactured by Fielden Electronics, Ltd., for the past 5 years, and experience gained during this period has been used in the design of new additions to their range. The *Tektor J.3.* level controller, which has just been released, comprises a simple oscillatory circuit which, when subjected to a change in electrical capacity, operates a relay for the control of electrical impulses to visible and audible alarms, etc. The change in electrical capacity is brought about by the presence or absence of the material to be measured—either liquid or solid—and this is detected by means of a simple metal rod inserted in the container at the point at which control is required. There are therefore no moving parts in the container.

The *Telstor Type L.F.3.* continuous level indicator embodies an electrode which is suspended from the top of the container and extends to its full depth. Impulses from this are relayed to suitable level indicators, which may be situated at points remote from the container.

ELECTRONIC PROCESS CONTROL

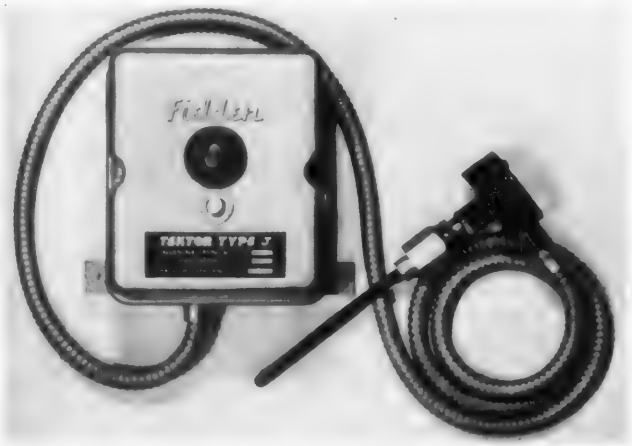
The recently installed control installation for continuous diffusers at the British Sugar Corporation's factory at Wissington in Norfolk, is said to be the first closed-loop electronic process control installation ever applied to the process of extracting

Designed by Eversheds and Vignoles, Ltd., in conjunction with the Corporation, the installation uses a variety of transducers for flow, level, temperature, etc., which provide an electric signal which is either applied to Eversheds 3-term process controllers, or used as an input to Eversheds simple analogue computers. Several of these computers provide an output signal which represents the continuous evaluation of the equation governing the part of the refining process to which they are applied.

The graphic control panel which forms the heart of the whole installation, embodies a number of Eversheds miniature recorders which will provide a permanent record of plant performance, and will also furnish data for accountancy purposes etc. An automatic alarm system, covering every vital part of the plant, also terminates at the panel.

Use has been made of the Eversheds "in-line" scanner, which allows one operator to supervise the whole of the plant pin-pointing at once the location of any possible irregularity.

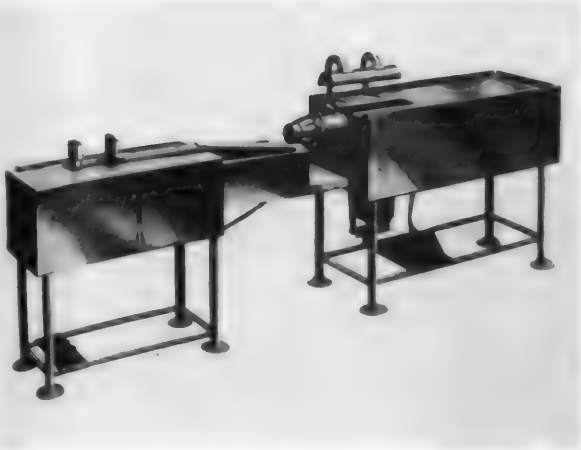
Transfer from automatic to manual operation of the plant, when desired, can easily be accomplished.



The Tektor J 3, one of several level control units added to the range made by Fielden Electronics, Ltd.

PNEUMATIC PRESS FOR BONELESS MEATS

A pneumatic press for the forming and packaging of boneless meats has been developed by Metal Units (Edinburgh), Ltd., in collaboration with Viscase, Ltd. Compressed air at 80 lb. p.s.i. operates the *Meta-Press* in



The Meta-Press, a pneumatic press for forming and packing boneless meats.

which the meat is pressed and forced into the casing through a nozzle which holds the casing into position. During pressing the nozzle is shut off from the well by a sliding gate.

With the gate closed the meat is placed in the well, a cover is brought down tightly at the press of 2 buttons and when the operator depresses a pedal a piston is thrust forward from the end of the well forcing the meat against the gate. The pedal is operated a second time and the piston comes forward a second time forcing the meat through the nozzle into the casing. Fingers holding the casing then collapse, releasing the cased meat.

The final stage is carried out by the *Meta-Clipping* machine which draws the casing tight and clips the end firmly. The gathered end of the casing is clamped by arms which move away and stretch the casing tight. The casing is clipped and the surplus ends trimmed off.

The *Meta-Press* comes in two sizes, one suitable for hams from 12-16 lb., and the other takes bacon rolls up to 26 in. long.

CONDUCTIVITY METER

An instrument which has been specially developed to assess the conductivity of cow's milk has been brought out as a production model by W. G. Pye and Co., Ltd. Known as the *Milcometer*, its use can provide timely warning of mastitis before the visible signs appear.

An electrode is dipped in the milk as part of a routine check; any sudden upward change in the reading from day to day indicates abnormality and warns the dairyman that the cow is mastitis suspect.

The *Milcometer* scale is marked in conductivity units, but underneath are coloured indicators showing green for "safe," yellow for "doubtful" and red for "suspect" milk. Two scales are given for temperature—the reading of the milk can be taken either straight from the udder or at dairy temperature.

The Pye Milcometer, an instrument for giving warning of the onset of mastitis in cows by measuring changes in the conductivity of milk.

Old cows, cows which have just calved and cows which have been cured of mastitis will generally give high conductivity readings. Providing the cow's history is known it will be the sudden upward change in conductivity which will indicate abnormality.

CATHODIC PROTECTION

Orders have recently been received for the installation of the *Guardion* system of cathodic protection for the elimination of corrosion in the tanks of spray-type and other pasteurisers.

The makers, F. A. Hughes and Co., Ltd., state that technical improvements have enabled them to reduce the cost of the system. Claiming that 100% results have been obtained in those machines already protected, they point out that any lining, however good, must break down some time and its renewal will be expensive in lost time and money. They claim that their system will last as long as the machine and can be installed within a few hours with the minimum of interference with normal operations.

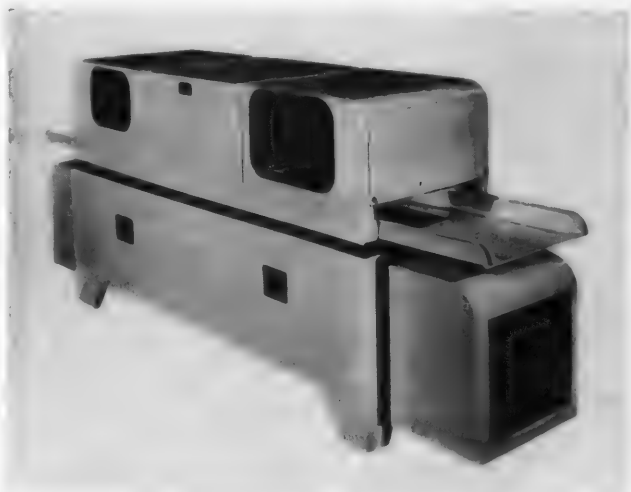
WASHING AND STERILISING MACHINE

Designed to wash all sizes of bakers' trays, boards, food containers, mixing bowls, etc., a fully automatic washing and sterilising machine has just been added to the range of washing machinery made by Oliver Douglas and Co., Ltd.

The articles to be washed are first given a high pressure detergent wash at 170°F. and are then subjected to a scalding hot rinse at high pressure.

The machine is fitted with easy to clean jet pipes and removable filter screens to ensure no clogging of the electrical pump units. The machine itself may be heated by either gas, steam or electricity and low running costs are claimed.

Feed is by conveyor belt or by gravity feed; the overall size of the machine is 10 ft. 6 in. × 3 ft. wide.



The Douglas washing and sterilising machine for bakers' trays and similar food containers.

News Digest

Sausages in Mayfair

The mystery and art of sausage making was demonstrated recently to M.P.s, meat trade experts, and journalists, in the elegant surroundings of Brown's Hotel, Mayfair. The demonstrator was Mr. Helmut Hilgeland, managing director of Foodtech, Ltd. His object was to show Mr. Norman Dodds, M.P., that the way a sausage was made was just as important to the final result as meat content. Mr. Dodds has raised the subject of meat content of sausages in the House of Commons. "The public," he told the Minister of Food, "is spending about £90 million a year on sausages. Will you do all you can to make it as difficult as possible for crafty sausage manufacturers to look upon the sausage as a profitable dustbin?"

Mr. Hilgeland's object was to demonstrate that by chopping meat in his firm's rotor chopper instead of squeezing it through the usual mincer a sausage could be produced which would not shrink and burst. He made a batch of 65% meat sausages with the rotor chopper, using the following ingredients:

2½ lb. pork, 1 lb. beef, 3 lb. fat, 1 lb. 15 oz. rusk and seasoning, 2 lb. water. He then made an identical batch with the conventional mincer, except that the beef was replaced by pork. Both batches were cooked and served. The rotor chopped sausages were full-sized and unwrinkled while the others burst and shrank. The general opinion was that the demonstration showed the importance of using the right kind of machinery.

Mr. Henry Spence, M.P., hon. vice-president of the Meat Traders' Federation, who also saw the demonstration, said that while it did not affect the issue of meat content, the machinery used for preparation undoubtedly made sausages easier to cook and to keep longer.

Dehydrated food exhibition

An exhibition was recently held in London to show recent advances made at the Experimental Factory of the Ministry of Agriculture, Fisheries and Food in Aberdeen.

Photographs illustrated the history of the drying of foods from the time of the ancient Egyptians up to the vacuum contact plate system which is in operation at the experimental factory at Aberdeen.

Many samples of dehydrated foods were also on display. These included

Mr. Helmut Hilgeland demonstrates his method of making sausages to Mr. Norman Dodds, M.P., at a demonstration in London recently. A few hours after the demonstration Mr. Dodds raised the question of the meat content of sausages in the House of Commons.

a 5 oz. meat bar ration which could be reconstituted to give the equivalent of 15 oz. cooked minced meat or could be eaten like a chocolate bar if the need arose.

Many of these dehydrated foods have been tested under various climatic conditions by Arctic and Antarctic Expeditions.

Lord Woolton, a former Minister of Food, was one of the many visitors to the exhibition.

Canned foods committee's meeting

The Comité International Permanent de la Conserve met in Paris in November. There were 105 delegates present from 13 European countries, Britain being represented by Dr. F. H. Banfield (British Food Manufacturers' Industries Research Association), Mr. F. J. Lawton (Food Manufacturers' Federation), Dr. D. Dickinson (Fruit and Vegetable Canning and Quick Freezing Research Station), Dr. G. Tattersall (H. J. Heinz Company) and Mr. V. J. Dreschfeld (Metal Box Company, Ltd.).

In his opening survey, Mr. Manaut (president) reviewed recent progress of the various committees dealing with voluntary standardisation of can capacities, the regulation and definition of canned vegetables, tomatoes, fish and meat. A whole day was set aside for discussion of the methods currently employed in Spain and Morocco for the canning of sardines.

The Scientific Committee met under the chairmanship of Dr. H. Cheftel (France), and considered contributions submitted by several of its members upon bacteriology, nutrition, methods of analysis and containers.

The next meeting of the Comité was arranged for autumn 1958 in Brussels during the course of the international exhibition there.

Crop Protection and Pest Control Exhibition

It is hoped that at least 25,000 visitors will be attracted to the Crop Protection and Pest Control Exhibition which is being staged at the Royal Horticultural Society's New Hall, Westminster, London, S.W.1, from May 12 to 15, 1958.

The exhibition, which is being organised by *World Crops*, the international journal of agriculture, will be concerned chiefly with the problems of weed control and pest control in agriculture and horticulture but attention will also be paid to domestic and industrial pests. Warehouse pests will be dealt with, and rodent control and other public health matters will fall within the exhibition's scope. The support of a number of associations and Government departments concerned with these fields is being invited.

Many thousands of invitation leaflets are being despatched to agriculturists and others in overseas countries, and it is hoped that the event will provide a stimulus to export sales of British agricultural chemicals and equipment. Many leading companies have already booked stands at the exhibition.

World Crops is a publication of the Leonard Hill Technical Group, which was recently responsible for the organisation of another highly specialised exhibition—the Corrosion Exhibition. This was held during October, 1957, and attracted 9,100 visitors in spite of its highly technical field. The Crop Protection and Pest Control Exhibition, however, will be open to the general public as well as to farmers, market gardeners, agricultural merchants, and horticultural and agricultural scientists.

Change of address

Colour Sprays, Ltd., have moved to Albion Works, North Road, London, N.7. Telephone: North 6091-4.

New flavours factory

To accommodate their growing interests in supplying flavours to the food and beverage industries, Lautier Fils, Ltd., have opened a new factory at North Feltham, Middlesex. Previously the flavour business was carried on at the company's headquarters at Power Road, Chiswick.

The new factory is operated by a subsidiary company, Lofil, Ltd., which was formed last year with Mr. W. A. Robertson as sales director and Mr. R. T. Burley as technical director.

At the new factory all blending operations are done in glass and stainless steel. Steam and heat are provided by an automatic oil-fired boiler. One of the more important uses of steam is to deodorise equipment between the blending of different flavours. A large business is done in soft drink essences and, indeed, a new depot was recently opened at Steeton, near Keighley, Yorks., to handle this trade in the north, where incidentally, one of the favourite essences is dandelion and burdock.

Lautier Fils are well known in the perfumery industry. Their products have been sold in this country since 1856. An agency was established here in 1874, and Lautier Fils, Ltd., was set up as a subsidiary of the French parent company in 1919. The modern factory at Chiswick was opened in 1938. Recent expansion was financed partly by a loan of £28,000 from the French company. The company intends to invest more in research and development, particularly in flavours. Employees now total 100.

The new flavours factory opened by Lofil Ltd., the Foodstuffs Division of Lautier Fils, Ltd., at Feltham, Middlesex.

Self-service conference

It has been announced that a conference will be held in conjunction with the Grocery and Provisions and Self-Service Exhibition which is being arranged by the Self-Service Development Association. This will take place in the Lecture Hall of the Royal Horticultural Hall. The exhibition itself takes place in the Royal Horticultural Hall, Westminster, London, on June 9-12, 1958.

New Cadbury-Fry depot

One of the largest and most up-to-date confectionery depots in the country has just been opened by Cadbury-Fry in Leeds. More than three times as large as their previous depot in this area, the new building has 50,000 sq. ft. of storage space which can house, at any time, 2,000 tons of stock. It cost about £250,000 to build.

The building has temperature and humidity control, a roof that can be instantly flooded in hot weather to lower inside temperature, air-filters to ensure dust-free conditions in storage rooms, "quiet," dust-proofed floors to dampen the sounds of trolleying, hydraulically-operated loading-bay floors to line up accurately with the platform of any van receiving the goods, and a private "under cover" railway siding.

The three massive storerooms in the two-storey buildings are windowless but they are brilliantly lit with batteries of fluorescent lights.

The depot, in Gelderd Road, some 2½ miles from Leeds city centre, will service customers within a 3,750 sq.-mile area of Yorkshire.

New pie factory

A new pie making factory has been opened by Brains (Food Products), Ltd., at Clay Hill, Bristol.

Over 20,000 pies are distributed daily throughout the West Country by the Brains delivery fleet.

This new factory produces only pies—pork, steak and kidney, and Cornish pasties. Other products—sausages, chipolatas, pressed meats, cooked hams, polonies, black pudding, etc.—are still being made at their factory at Park Road, Kingswood. Eventually it is hoped to centralise all products at Clay Hill.

Brains first started making sausages in 1934 in a small room at Upper York Street, Bristol. Their machinery consisted of a hand mincer and a hand filler. Today they are making more than 20,000 lb. of sausages a week. The company started making pies in 1938.

U.S. quick-freezing developments

Arriving back in England after a 5-week tour of freezing plants in America, Mr. J. R. Parratt, chairman of Birds Eye Foods, Ltd., said, that the frozen food turnover in America is going up at an annual rate of 10%. At present it is running at around 2 billion dollars (approximately £714 million) per annum, of which a large proportion is handled through the chain stores and the supermarkets.

Mechanisation plays a leading part in the factory operation, owing to exceedingly high labour costs, and whilst machinery similar to that found in American factories is already in use in this country, it will be some time before mechanisation will reach the extent it has in America because of the difference in labour availability.

Ready-prepared products—fried potato chips and pies in particular—have proved a successful development in America, and Birds Eye have already found a similar trend in this country.

Bakery scholarship awards

The Scholarship Joint Panel of the National Association of Master Bakers, Confectioners and Caterers, and the National Board for Bakery Education, has announced that £3,855 has been awarded to 33 successful candidates. The National Association has also awarded 4 special scholarships.

Sugar-derived emulsifying agents

A range of sucrose or sugar esters is now being manufactured by Howards of Ilford, Ltd., under licence from the Sugar Research Foundation.

Sucrose esters are non-ionic surface-active agents recommended as non-toxic emulsifiers in the food industry and in cosmetics, pharmaceuticals and animal feedingstuffs and as detergents, particularly in the textile and allied trades.

Howards will market the sucrose esters under their trade name *Sorbester S*. The first four products on the range which are now available in pilot-plant quantities are:

Sorbester Emulsifier S.212 sucrose di-laurate; *Sorbester Emulsifier* S.312 sucrose tri-laurate; *Sorbester Emulsifier* S.18 sucrose stearate (mixed mono-di); *Sorbester Emulsifier* S.218 sucrose di-stearate.

Samples are available.

PEOPLE

MR. JACK SEAR has been appointed export sales manager of Nabisco Foods, Ltd. He has been with the company for 22 years.

▪

MR. M. G. DE BAAT, having reached retirement age, has relinquished office as a director of Unilever, Ltd., and Unilever N.V.

▪

MR. JOHN DAWSON, home sales manager of Carrs of Carlisle, biscuit manufacturers, has been elected a Fellow of the Institute of Certificated Grocers.

▪

MR. R. A. EEDE, who has for twelve years been with a packaging machinery firm, has joined Alite Machines, Ltd., as southern area technical representative.

▪

MR. C. B. MORRISON has been elected chairman of the board and MR. E. M. HEAP and MR. R. H. HEMMINGS appointed joint managing directors of York Shipley, Ltd.

▪

MR. MEWBURN WOOD has been appointed sales manager, responsible for the marketing of the products of the London sausage and pie factory of the Excel Co., Ltd.

▪

MR. R. H. G. SWAIN has been appointed purchasing director by T. Wall and Sons (Meat Products), Ltd., of London and Manchester. He has been the sales director of the company since it was formed in 1955. The functions of the sales director are now amalgamated with those of the marketing director, Mr. J. H. Penny.

MR. J. A. P. FRIEDLANDER is appointed head of the "live-pig" procurement department.

▪

MR. VICTOR MARX, secretary/treasurer of the American Society of Bakery Engineers, has been elected an honorary associate member of the British Baking Industries Research Association for his services in America to the British baking industry, and, in particular, for assisting visits of members of the research association by introducing them to progressive American associations. Mr. Marx joins a very select few, only three persons, all Britons, having previously been given this honour.

Change of address

The western area offices of Evershed and Vignoles, Ltd., have been moved to the Stock Exchange Buildings, St. Nicholas Street, Bristol, 1.

NEW MEAT PRODUCTS LABORATORY

The enlarged research laboratories at Wythenshawe, Manchester, belonging to John Crampton and Co., Ltd., which, along with a test kitchen, were opened recently by Mr. W. Arnold Innes, chairman of the Cerebos Group of companies. Addressing the guests at the opening, Mr. Innes said that a good pork sausage should contain 65% meat and a good beef sausage not less than 50%. The new facilities will be used for research, analytical tests and quality control and to assist the meat trade as a whole.

Erections and Extensions

The British Sugar Corporation is having two sugar silos built at Briggs, Lincs.

▪

Kraft Foods, Ltd., are having two storage depots built at Hayes, Middx., at a cost of £150,000.

▪

Neilson's Ice Cream Co., Ltd., plan to build an ice cream depot at Bonney Street, London, N.W.1.

▪

Stockton Co-operative Society, Ltd., are having a cold store and warehouse built at Worthing Street, Stockton-on-Tees.

▪

Hygrade Corrugated Cases, Ltd., are planning to erect an extension to their factory at Trumpers Way, Southall, Middlesex.

▪

West Cumberland Farmers' Trading Society, Ltd., are having a grain storage building erected at Hexham, Northumberland.

▪

Plenty and Son, Ltd., have purchased a new factory site with existing buildings at Shaw, Berks., which will be used for making their smaller pumps, filters and *Impelator* equipment.

Newcastle Breweries, Ltd., are having a large bottling store built at Gallowgate, Newcastle-on-Tyne.

▪

Frozen Fresh (Fillets), Ltd., have opened a food processing factory at West Street, Gravesend, Kent.

▪

British Oil and Cake Mills, Ltd., are planning to construct a laboratory and offices adjoining their factory in Trafford Wharf Road, Manchester, 17.

▪

Reed Corrugated Cases, Ltd., have plans in hand to build a new factory and improve their existing works premises at Ayres Road, Trafford Park, Manchester, 16.

▪

Robinson (Confectioners), Ltd., manufacturing confectioners, have plans in hand to extend their premises at 47-65, New Street, West Bromwich.

▪

Brooke, Bond and Co., Ltd., tea merchants, Goulson Street, London, E.1, are planning to build a tea blending and packing factory at East Common, Redbourn, St. Albans, Herts.

First production at new Batchelor factory

Soup mixes are being produced in the first completed part of the new £2·5 million Batchelor factory at Ashford, Kent. The cannery section will be ready for production of processed pears and fresh garden peas and other lines by August, 1958.

This was announced recently by Col. M. W. Batchelor.

Heinz factory in production next year

According to the chairman of H. J. Heinz Co., Ltd., their new factory at Kitts Green, Lancs., on which £1·7 million was spent in the past year, will begin production on a limited scale early next year and come into production in all departments before the end of the year.

An increase in the pace of evolution of the food processing industries of Western Europe is anticipated in the future, following the pattern of development which has already taken place in North America.

The company's range of *Strained Foods* has now been expanded to include 20 varieties and a similar range is envisaged for their range of Junior Foods which were introduced to this country in June.

Bread plant enlarged

While there had been a general fall in bread consumption throughout the country, the United Co-operative Baking Society, Glasgow, still held its place as the largest bread bakers in the country, said Mr. James Lang, chairman, when he spoke at the recent quarterly meeting in Glasgow.

He said that in 1946 the society was supplying 53 societies with loaf bread, while to-day 124 societies bought their loaves, leaving only 19 societies and two small federations baking their own bread.

With the introduction of further bread-baking plant at the McNeil Street, Glasgow (bakery), the society now had a total productive capacity for loaf bread at this and the Dunfermline bakery equal to 100 sacks of flour per hr. At these two bakeries it has been found necessary to install additional travelling ovens, with ancillary equipment.

Mr. Lang stated that in 1946 the society used 5,218 sacks of flour weekly in the production of all products, a figure which has now risen to 11,073 sacks. They baked no less than 27 varieties of bread.

Mr. Lang added that the sales for the quarter ending July 6 were £1,974,200, an advance of £161,491 compared with the corresponding quarter of last year and greater than the total for 1946.

OBITER DICTA

● It is something new to say that a man has a feminine streak because he is fond of chocolate. —*Mr. Commissioner Flowers hearing a divorce case.*

● I was in the navy in the war running margarine to the Jugoslav partisans. Tricky business. They'd always fire on us when they saw us coming.—*Mr. Alec Guinness.*

● Mr. Kruschev's statement that "the British lion does not frighten anyone any more" is being hailed in Whitehall as a triumph for the Egg Marketing Board.—*Daily Telegraph.*

● Launch your own Spudnik. Satellites, bacon and potatoes are news. Bacon prices are down, satellites are up. Here is the perfect snack to serve your teleguests.—*Publicity Handout.*

● Pickle Week is being sponsored by the National Pickle Packers Association "to add fun to this tired old world and to honour the pickle pedlar, Amerigo Vespucci, for whom this Continent was named."—*American Press Release.*

● Anna Maria Alberghetti is a fragile, slim young lady who obviously intends to stay that way. . . . She does not smoke or drink, and has vowed to eat no candles, pastries or ice cream for a year.—*Chicago Sunday Tribune.*

● Los Angeles has a new product: canned smog. It is put out by the "Los Angeles Smog Corporation," which is more interested in making a complaint than a profit. There have been many campaigns to clean the air over the city.—*Daily Telegraph.*

● Agricultural production, they say, is now 60% above pre-war figures. Couldn't we be just as happy with 59·9% and keep a few rabbits alive to diversify the countryside even if they do devour the equivalent of 10,000 synthetic pork pies a year.—*Peter Simple, Daily Telegraph.*

● A man walked up to the counter in a Jersey income tax office, placed a loaf of bread on it, took off his coat and placed it on top of the loaf. Then he put his income tax demand note on top of the coat. He said to the surprised clerk: "There is the bread out of my mouth and the coat off my back. Now you've got the lot." Then he walked out. Income tax in Jersey is 4s. in the £.—*Manchester Guardian.*

News for Importers

Canned salmon imports.—The extension of Anglo-Japanese trade arrangements for a period of six months ending March 31, 1958, provides for a small increase in the imports of canned salmon.

The quota for the import of canned salmon from Japan for the current six months is £2,610,000 c.i.f., £165,000 more than half the previous annual quota. The import quota for canned tuna has been reduced correspondingly by £165,000.

Details are given in Notice to Importers No. 835, dated October 25, 1957, issued by the Import Licensing Branch of the Board of Trade.

Imports of Potatoes.—In accordance with the statement made by the Minister of Agriculture, Fisheries and Food, in the House of Commons on December 2, the Board of Trade announce that imports of main crop potatoes will be permitted under Open Individual Licences valid for the period ending June 30, 1958.

Details are given in Notice to Importers No. 839, dated December 4, issued by the Import Licensing Branch of the Board of Trade. The Open Individual Licences will be valid for imports from the Sterling Area and relaxation countries, *i.e.* Western Europe and certain other non-dollar countries.

Sugar Imports.—In accordance with the provision of Article 7 of the International Sugar Agreement, the Board of Trade has announced that the unrestricted issue of licences for the import of sugar from countries which do not participate in the Agreement will be discontinued. Sugar imports from non-member countries will again be regulated under a quota fixed in accordance with the Agreement.

Notice to Importers No. 836 announcing the detailed licensing arrangement has been issued by the Import Licensing Branch of the Board of Trade.

Japanese Import Quotas.—The Anglo-Japanese trade arrangements have been extended for a period of 6 months ending March 31, 1958. Under this arrangement, the various import quotas established for the period ending September 30, 1957, are to be increased by one half over the amounts originally fixed for 1 year, with the exception of canned tuna, where the increase is 17% (£85,000) and of canned salmon, where the increase is approximately 53% (£2,610,000).

Imports of canned crab and bottled and canned mandarin oranges will again be permitted without limitation of quantity under Open Individual Licences.

Details of the extended quotas and the methods by which traders should apply for licences are given in Notice to Importers No. 837 issued by the Import Licensing Branch of the Board of Trade.

Food News Overseas

Nicaraguan powdered foods

A new firm known as Soluble Foods Inc., with a capital of C$3½ million, has been organised in Nicaragua to produce soluble coffee, cocoa, and banana flour, mainly for export.

Fish sales organisation

Moroccan fish packers have formed an organisation called the "Union Commerciale de l'Industrie de la Conserve au Maroc" (U.C.I.C.), having sole selling rights for their members produce. The move was said to have been made in the interest of economy and efficiency.

Turkish milk plant

A pasteurising factory built in Ankara, Turkey, with funds from U.N.I.C.E.F. was inaugurated recently. It can pasteurise 100 tons of milk daily. It will also produce pasteurised butter. However, owing to the inadequacy of milk supplies it can at present only operate at about 25% capacity or less.

Sugar research stations

Firms in the Dominican Republic engaged in sugar production are to be obliged to maintain research stations, which will be State-aided. The encouragement of research work on new varieties of sugar-cane and on plant genetics is part of a Government campaign to increase sugar production still further. Annual output has more than doubled since 1950 when 490,000 tons were produced, compared with the estimated crop of 1,200,000 tons for 1957.

Britain is the Republic's best sugar customer. Dominican sugar worth £12 million was imported by British refiners in 1956.

Uganda coffee factory

Reporting on the progress of the building of a new £175,000 coffee curing factory at Mbale, Uganda, Barclays Bank D.C.O. says it will be the best equipped and the most modern in the whole of Africa. It is being built by the Bugisu Coffee Board.

The factory, which is almost half completed, is not expected to come into full-scale production before the beginning of the 1958-59 coffee season. But it is hoped that building will be completed before the end of the coming season.

The factory capacity will be four tons of clean coffee an hr., says the bank. Because two 8-hr. shifts will be worked 6 days a week at the seasonal peak, it will be able to handle more than 350 tons of coffee a week.

Dominican food exports

Figures just released by the Dominican Republic Government covering the last twenty years reveal a considerable expansion in food production and export. The area of land under cultivation in the Republic has risen by nearly a half since 1936, and exports of the three main crops—sugar, coffee and cocoa—have gone up from $12·1 million in 1936 to $83 million in 1956.

Increases in exports were: refined sugar from $60,000 to $3 million; crude sugar from $8·5 million to $49 million ($35 million worth bought by British refiners); coffee from $2 million to $32·7 million and cocoa from $1·6 million to $8·9 million.

Other food-stuffs which have shown a big increase in production are rice, maize, and groundnuts.

An Invitation to Authors

The publishers of FOOD MANUFACTURE invite the submission of manuscripts of books to be considered for publication. All manuscripts will be promptly acknowledged and carefully considered by qualified experts. A synopsis with chapter headings should be sent in the first instance to:

The Manager,
Leonard Hill (Books) Ltd.,
Leonard Hill House,
Eden Street,
London, N.W.1.

Leonard Hill are specialists in industrial, technical and scientific books. They have a reputation for vigorous and successful promotion of their books by extensive advertising and maintain a world-wide selling and distributing organisation.

Table-salt plant

The local council of Eliat, on the Gulf of Aqaba, has approved a scheme to invest private capital in a plant to refine table salt from sea water. This will produce, as a by-product, about 30 cu. metres of distilled water daily at no extra cost, and will thus contribute to the solution of the town's drinking water problem for the next 2 years. The proposal awaits the approval of the Israeli Government.

Philippine flour-mill contract

A contract worth nearly $1 million has been placed with Thomas Robinson and Son, Ltd., Rochdale, by Republic Flourmills, Inc., a newly formed company in the Philippines. The contract covers the design and equipment of the first flour mill to be erected in the Philippines.

Robinsons have advised the new company on every aspect of the enterprise.

Sited on the Pasig River, the mill will be capable of handling some 240 tons of wheat in 24 hours.

Milk plant starts up

Milk sterilising equipment imported by the Ceylon Milk Board has started operation. The entire project has been financed by the New Zealand Government at a cost of Rs. 2·1 million. Initial capacity of the plant will be 10,000 pints daily, but it is hoped to increase it to 30,000 pints within the first three months of operations.

The Board has placed an order with a U.K. firm for a £10,000 butter-making plant. The equipment will be capable of supplying the entire local demand for butter, imports of which (mainly from Australia) were valued at Rs. 4·6 million in 1956.

Booklets Received

▸ Leaflets issued by Airpel, Ltd., give details of their wide range of filters and filter-elements of various designs and state that it has extensive facilities available for the design and construction of filter-elements for customers' particular requirements.

▸ Details of *Mopump* condensate return sets are given in a pamphlet issued by Rhodes, Brydon and Youatt, Ltd. The *Mopump* is a "package" type of unit consisting of a condensate receiving vessel and centrifugal pump mounted on a baseplate with built-in electrical operating gear.

New Companies

Frozen Foods (Birmingham), Ltd. (591825.) 67, Jamaica Row, Birmingham, 5. £100. Dirs.: G. W. Sammons and H. R. Hands.

Home Made Preserves, Ltd. (592179.) 214, Hastilar Road South, Sheffield, 13. Mnfrs. of and dealers in foodstuffs, preserves, etc. £1,000. Dirs.: R. and Amy Asher, N. C. and Dorothy Hoyland.

J. Kirby and Co., Ltd. (592118.) Seed crushers and mnfrs. of linseed, cotton and other cakes, oil extractors, etc. £30,000. Subs.: J. Kirby, Matthewsgreen Farm, Wokingham, and C. Kirby.

Miranda Nut Products, Ltd. (592334.) 86, Northgate Street, Chester. Nut food mnfrs. £5,000. Subs.: F. L. Elsworth and K. D. Nieto.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

"Grand National Night"

The dramatic section of W. J. Bush and Co., Ltd., again entertained their colleagues and trade friends with a play put on at the Cripplegate Theatre, London, from December 17 to 20. Mr. Eric Bush produced and took the leading rôle. The choice this year was "Grand National Night," a drama revolving around the violent death of the alcoholic wife of a Liverpool shipping magnate on the night of the Grand National. The unhappily married Gerald Coates is certainly responsible for his wife's death, accident or not. But the only possible witnesses are the old butler and a neighbour who admits he was drunk and so is unsure anyway. The butler keeps quiet out of respect and sympathy for his harassed employer. All evidence is circumstantial except for a railway ticket found in Coates's raincoat pocket which could prove he had been in Liverpool on Grand National Night. But at the last minute the boozy neighbour—a potential witness for the prosecution—turns up and claims the raincoat and the vital ticket.

Mr. Bush was convincing and always interesting as Coates, a rôle which virtually carries the play. Miss Billie Bunyan made a brief but effective appearance as his unpleasant wife and Mr. Maurice Lockwood was calm and irascible by turns as the lawyer. Mr. Denis Arnold did very well as the butler, particularly in his passages with the Detective Inspector (played by John Cox). Mr. Percy Hogg dithered effectively as the dim-wit neighbour and Mr. Walter Oakley made the most of the humour in the part of the police sergeant. Miss Nina Main was an attractive distraction for Coates and Miss Beryl Jackson was a sympathetic sister-in-law.

The applause of the audience testified to the success of yet another Bush Christmas presentation.

Technical Press Review

January

Dairy Engineering.—Special Issue: New Forms of Milk; Liquid Milk in Many Forms; Slot Machines for Higher Sales of Milk; Yogurt; "Vitaminised Milks"; More Milk Powder for Less Labour; Continental Experiences with Milk Cartons.

World Crops.—Insect Enemies of Tropical Timber; Teak Forests of Northern Thailand; Afforestation of the Swamplands of Finland; Review of Equipment and Machinery at the Smithfield Show.

Manufacturing Chemist—Instrumentation in the Small Factory; Flow Measurement in the Chemical Industry; Instruments Survey; Ilfords' New Laboratory; Synthesis of 2-Deoxy-D-Ribose; Radio-Chemical Centre Enlarged; Crosfields' New Silicates Plant.

Petroleum.—Review of Refining in Great Britain; Steel for the Petroleum Industry; Construction at Fawley Refinery.

Atomics.—Metallurgical Development and Atomic Energy; Metallurgical Research; Mass Transfer; Blind River Uranium Field in Canada; Rolling Mills for Fuel Elements; Atomic Age Microscope.

Corrosion Technology.—Special Issue: Pipelines; High Temperature Hydrogen Sulphide Corrosion in Commercial Sovaformer Units; Humidity and Temperature Test Cabinets; Polyvinyl Chloride Tape in Corrosion Mitigation Programmes; Protecting Steel Structures in Salt Atmospheres; Underground Corrosion—1; Corrosion of Type Metal.

Fibres.—Some American Developments in Textile Chemistry; Chemicals in Synthetic Fibre Manufacture; Fabrics Containing Cotton-Type Terylene Polyester Fibre.

Paint Manufacture.—Wetting Agents in Paints; Mica in Emulsion Paints; Styrenated Alkyds; Waxes in Relation to Carbon Paper Inks.

Chemical and Process Engineering.—Efficient High-Temperature Heating With "Dowtherm"; Gas Turbines as Prime Movers in the Chemical Industry; New Ideas in Steam-Raising for the Chemical Industry; Analysis of 3-Component Liquid Systems.

Automation Progress.—Special Issue: Television Receivers: Rationalisation of Radio and TV Manufacture; Handling and Assembly of TV Receivers; Czechoslovak Machine Tool Progress; New Development in Ultrasonic Machining; Probabilistic Missiles.

Specimen copies are available by writing to The Publishers, Leonard Hill House, Eden Street, London, N.W.1.

Trade Marks

JUMBALORE.—763,845. Biscuits (other than biscuits for animals). **Symbol Biscuits, Ltd.,** Sunya House, Scrubs Lane, Willesden, London, N.W.10.

CHOCABYE.—751,913. Milk, dairy products (for food), edible oils and fats, all being flavoured with chocolate. **E. Hack,** Lion House, Red Lion Street, London, W.C.1.

DANARCTIC.—762,656. Meat, fish, poultry and game; fruits and vegetables; and milk and dairy products (for food), all being goods preserved by freezing. **S. Daniels and Co., Ltd.,** Oxford House, Crosswall, London, E.C.3.

RUMPELMAYER.—752,490. Pastries, non-medicated confectionery, sugar and honey. **Robert Veiel,** Rue Jacob 26, Paris, France.

MAYFLOWER FRESH DONUTS.—756,046. Doughnuts. **DCA Industries, Ltd.,** Doughnut House, Westmoreland Road, Queensbury, London, N.W.9.

BATGERS FIESTA FRUITS.—B761,698. Non-medicated fruit-flavoured sugar confectionery. **Batger and Co., Ltd.,** 44, South Side, Clapham Common, London, S.W.4.

CHOCOLATE DOUBLOONS.—B762,110. Chocolate, chocolates, and non-medicated chocolate confectionery. **Nestlé Co., Ltd.,** Hayes, Middlesex.

TANGO.—762,390. Tea. **Tuckfields Teas,** 3, Market Street, South Yarra, Victoria, Australia.

M.P.P.—B762,847. Potato flour for use as an ingredient in the preparation of food. **M.P.P. (Products), Ltd.,** Carrow Works, Norwich.

MUSTICKS.—764,544. Non-medicated sugar confectionery. **Kent Confectionery (Maidenhead), Ltd.,** 72, St. Marks Road, Maidenhead, Berks.

RASTICKS.—764,545. Non-medicated sugar confectionery. **Kent Confectionery (Maidenhead), Ltd.,** 72, St. Marks Road, Maidenhead, Berks.

JEMSON.—B753,316. Fresh fruits and fresh vegetables. **J. E. Martin and Son, Ltd.,** 6, Stratford Market, London, E.15.

CHOCABYE.—751,915 and **CHOC-O-NUT.**—762,148. Non-alcoholic drinks, all being flavoured with chocolate. **E. Hack,** Lion House, Red Lion Street, London, W.C.1.

BOSCO.—B755,766. Non-alcoholic drinks and preparations for making such drinks. **Corn Products Refining Co.,** 17, Battery Place, City and State of New York, U.S.A.

KELDONA.—764,919. Non-alcoholic drinks and preparations for making such drinks; and fruit juices. **Optrex, Ltd.,** 17, Wadsworth Road, Perivale, Greenford, Middlesex.

RED TAG.—B740,194. Canned fruits. **Paulus Bros. Packing Co.,** 14th and Oxford Streets, Salem, Oregon, U.S.A.

COMEX.—759,966. Shortening fats for pastry, being goods for sale in England, Wales, Northern Ireland and the Isle of Man. **Co-operative Wholesale Society, Ltd.,** 1, Balloon Street, Manchester.

CHALLENGE.—760,944. Preparations for the preparation of soups; and mixed fruit peel and glacé cherries; all being goods for sale in Northern Ireland. **Robert Ross and Co.,** 2B, Alexandra Park Avenue, Belfast, Northern Ireland.

PARK DRIVE.—762,541. Non-medicated confectionery. **Gallaher, Ltd.,** Virginia House, 134-148, York Street, Belfast, Northern Ireland.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

785,713 D. C. PARR: Carbonating apparatus for making aerated water and like liquids.
785,793. COW AND GATE, LTD., G. M. ROBERTSON and G. K. CHARLES: Cheese-making and apparatus therefor.
785,795. S. E. O. W. ERASMIE and B. O. SCHLYTER: Preserving food.
786,428. F. WHITE: Moulding devices for use in the flour confectionery and baking trades.
786,606. BRAUNSCHWEIGISCHE MASCHINENBAUANSTAULT: Apparatus for extracting liquid materials from vegetable materials.
786,473. S. STEPHAN: Meat cutters.
786,700. R. D. PITTS and F. COREY: Poultry processing equipment.
786,704. H. E. HANSEN: Cooking vessels.
786,774. R. POULET: Glaze for pastry, biscuits and bread.
786,798. KRAFT FOODS: Cheese manufacture.
786,973. BREWING PATENTS and I. R. A. POLLOCK: Malt products.
787,127. MONSANTO CHEMICAL CO.: Clarification of sugar juices.
787,080. SPOONER FOOD MACHINERY ENGINEERING CO., LTD.: Steaming of dough products.
787,210. W. WENDT: Synthetic foils and the like.

ABSTRACTS OF BRITISH PATENTS

Producing frozen fish

A method is described for the production of frozen fish pieces of uniform weight and size. Pieces of fresh fish are placed in a pressing form in which they are held tightly confined in walls extending parallel to the main direction of the fibres. In the form they are subjected to a pressure of at least 0·5 kg./cm² above atmospheric pressure, sufficient to cause reshaping of the pieces even in the plane at right angles to the pressure direction and in the direction of the fibres, making them fill the cross-sectional shape of the form. The pressed block thus produced is thereupon frozen and finally divided along planes at right angles to the direction of pressing.

The pieces may be coated with an agent which will aid in their cohesion. It has been found that a solution of actomyosin, the fibrous protein dissolved from the fish muscle with the aid of a suitable salt solution, forms the ideal agent for this purpose.

A machine for carrying out this process has an upper and lower piston which can be moved up and down while fitting tightly within the walls of the form. The lower piston is lowered after each pressing operation by a distance corresponding to the height of a pressed portion, the upper piston is pressed against the material and withdrawn again, leaving a space into which more fish may be inserted for pressing. This avoids the need for inserting fish pieces to an exact depth. —781,620. *Norsk Frossenfisk A/L.*

Mixing apparatus

This invention concerns apparatus for the batch mixing of cereals and similar granular materials, the apparatus being a horizontal mixing machine which may rest on the ground and discharge the mixed cereals at a height suitable for bagging.

The mixer has a drive shaft mounted to rotate on a horizontal axis, with beater arms attached. The bottom of the tank is so shaped that the beaters sweep out a path which approximates to the contour of the bottom. A scoop means is mounted to revolve with the beaters and to deposit the material, after mixing, into a discharge chute, the opening of which normally remains closed.

The discharge means may be placed at or adjacent the top of the tank. A slide or other plate opens and closes the chute which discharges the contents at a suitable height for bagging.—784,525. *Powlings Patent Processes, Ltd.*

Folding chocolate mould

An automatic chocolate moulding plant for making hollow articles has a number of interconnected mould carriers running in a pair of opposed grooves and a number of foldable moulds. Each of these moulds has a pair of hinged mould sections which may be closed with their upper sides upon each other for the assembly of shells formed in the moulding cavities of each section. The first section of each mould has a frame which inserts into the grooves in the carrier while the second section of the mould is able to swing through 180° from its normal position in which the upper sides of the two sections lie horizontal.

It is stated that these moulds may be easily replaced in a short time and they may be fitted in existing plant without necessitating substantial modifications. No guide rails are necessary for keeping the mould in a closed position.

In an embodiment of the invention the second of the mould sections may be fitted with resilient arresting means for holding the mould section in position, which is released by the mould striking a stationary guide during its travel.

In another embodiment of this invention the holding and release means may be in direct engagement with the corresponding mould carrier, in which case the mould frame need only support one-half of the mould since the other half of the mould is supported by the mould carrier.—781,709. *Mikkrovaerk A/S.*

Sausage machine

A linking and apportioning device in a sausage machine has a rotatable apportioning chamber in the machine housing consisting of an apportioning sleeve, with a piston, and a cooling unit which cools the sleeve, the meat inside, and the moving parts in the chamber. The cooling unit forms a jacket enclosing the apportioning sleeve or the divider sleeve respectively. This cooling is stated to be advantageous in that it stops the lubricant from liquefying and running out of the machine.

In an embodiment of the idea, the front end of the divider sleeve is designed like a sliding bearing while the rear part is journalled in a ball bearing provided by the machine housing. This ball bearing receives the bearing from the rear of the divider sleeve, giving smooth operation of the sleeve.

The annular chamber receives any meat which might penetrate between the sleeve and its journals. This chamber is also connected to a discharge through which the sausage meat in addition to the air in the chamber may be discharged.

The apportioning chamber may be lubricated by connecting a feed line to the gap between the divider sleeve and the housing. This feed line may also be connected to the annular chamber enclosing the divider sleeve which may be filled with fat.

Sealing between the discharge piston and the divider sleeve is effected through an expansion chamber on the circumference of the piston formed by a lip sealed groove closed towards the rear of the piston. The expansion chamber may be arranged on both sides of the lip seal so that any sausage meat adhering to the side of the divider sleeve is scraped off.—681,674. *Vemag Verdener Maschinen- und Apparatebau, Zweigniederlassung der Sudostholz G.m.b.H. Metz and Co.*

Christmas Greetings

We thank the many readers who sent us their greetings for the Christmas season, including the following firms:

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F. D. Mehta and Co., Bombay.
Energen Foods Co., Ltd.
Industrial Research and Development Laboratories.

To them and to all our readers we extend our best wishes for the coming year.

New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

Wood engraving by John Farleigh

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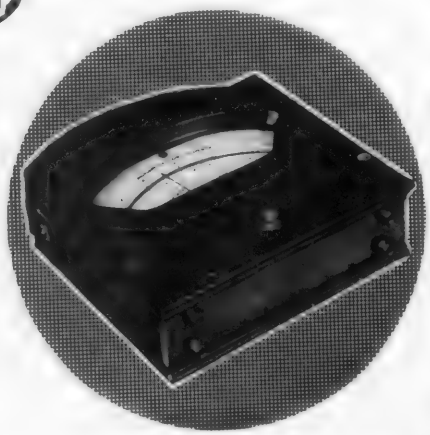

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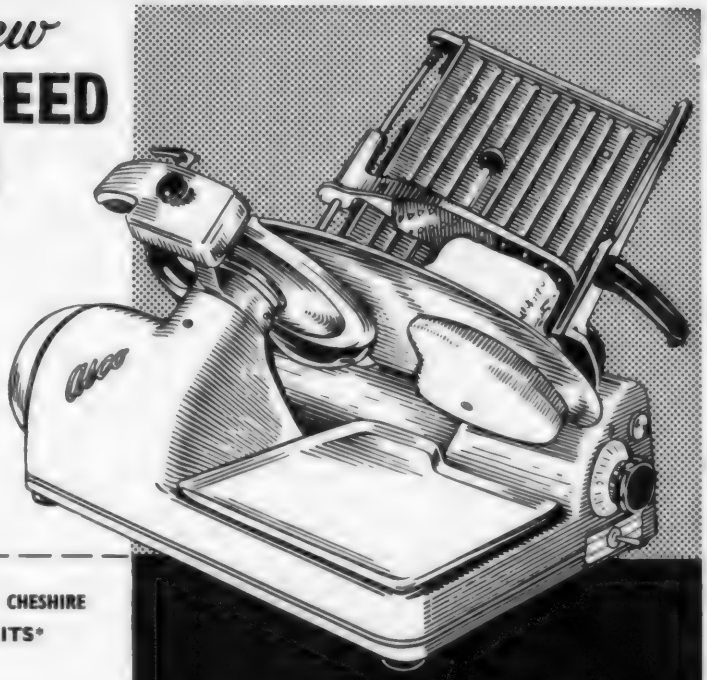

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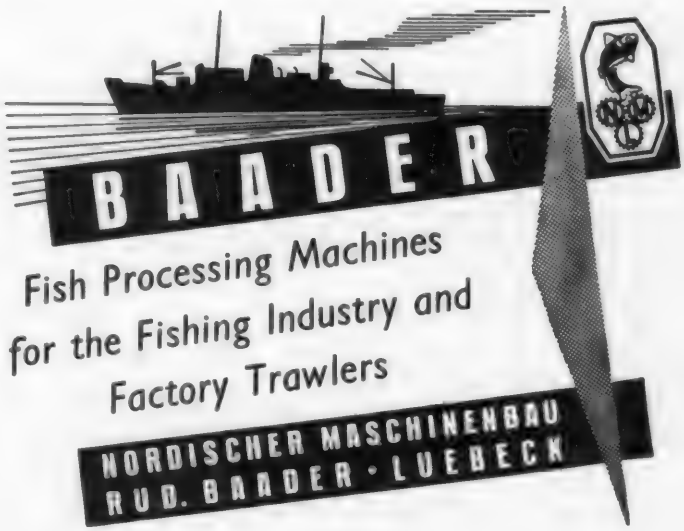

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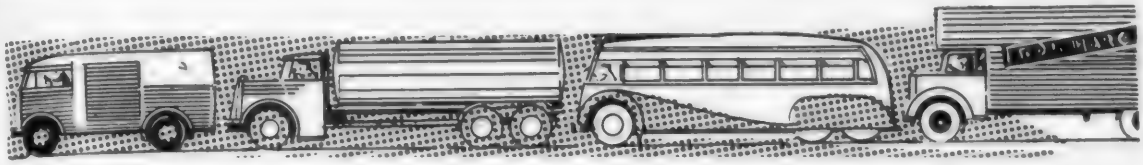

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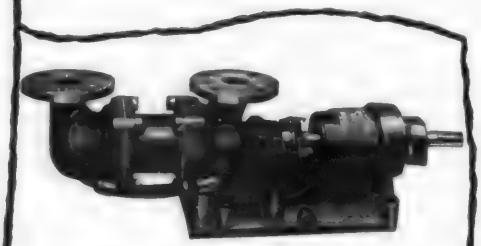

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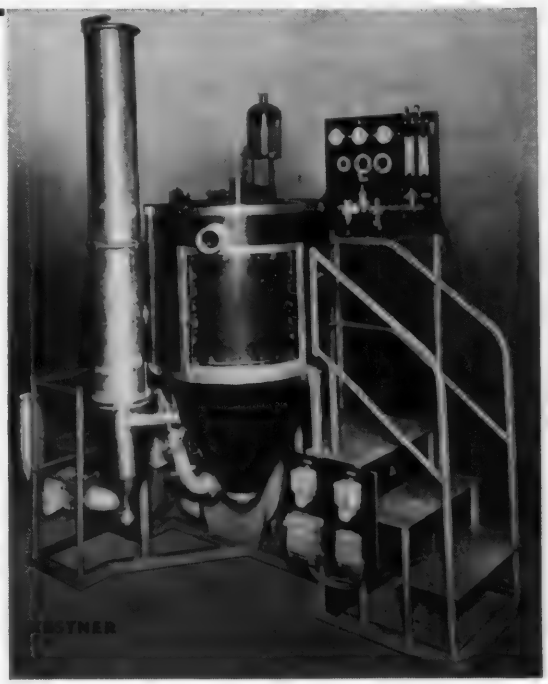

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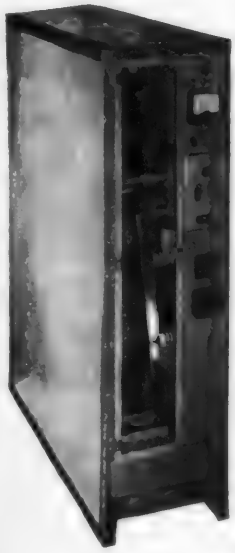

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Rye Flour	12	10	1·4	74	3,560
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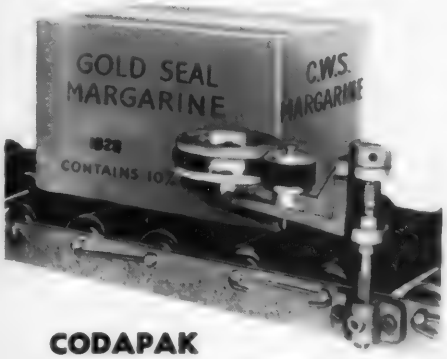

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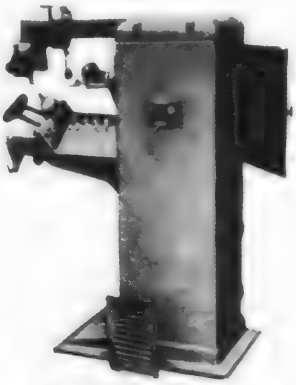

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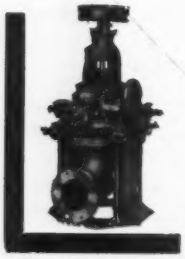

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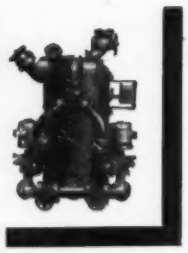

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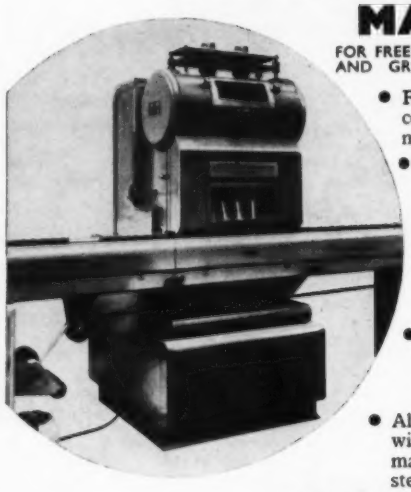

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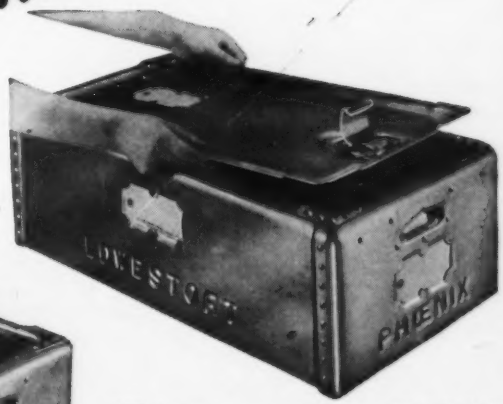

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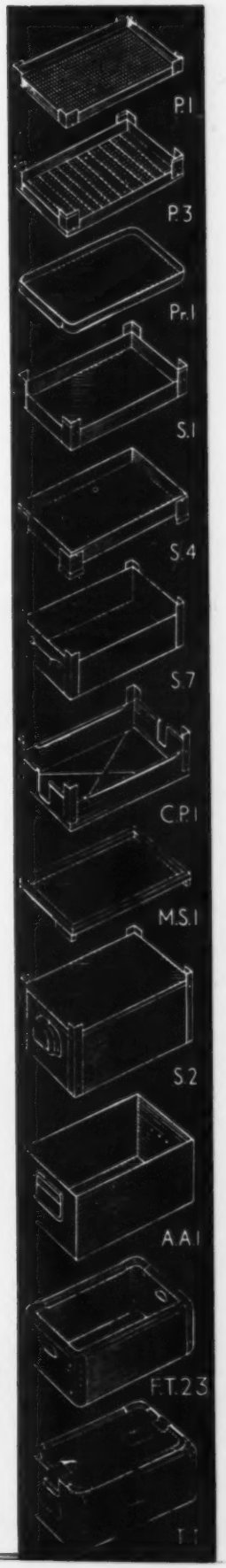

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